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Remarks
ON
CLINICAL APPLICATIONS OF THE RECENT WORK ON BONE DISEASE *

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It would be difficult to find a subject in medicine which has yielded such a rich harvest to the investigator in recent years as that of bone disease. All branches of medical science have played their part, and have not only added greatly to knowledge of the physiology and pathology of bone, but have placed in the hands of the medical profession a number of valuable weapons for diagnosing, preventing, and curing many of the more common metabolic bone diseases. In opening this discussion my object must be to give an outline of the most important of these discoveries and their clinical applications.

Enrichment in knowledge of bone disease has depended in the main on two lines of investigation: the influence on bone structure of (1) dietetic and environmental factors; (2) the parathyroid glands. No doubt these two factors are themselves related in some way; recent work has been directed to the investigation of this association, but, up to the present, without much success. On the other hand, the increased powers of controlling bone disease which have followed the main discoveries have resulted in much activity in all branches of the subject, so that the accessory methods involved in the diagnosis and treatment of bone disease have become of greater significance and importance. Thus methods of radiography, histological technique, blood and urinary chemistry, are now more valuable as instruments of precision. In addition, the morbid pathology of the subject has been quickened by its association with the experimental method, and numerous facts, previously discovered by pathologists, have gained the interest and importance that were their due.

The Influence of Dietetic and Environmental Factors on Bone

It is now known that in the normal animal the structure of bone is the outcome of a struggle between two influences—one tending to produce perfect formation and calcification with the deposition in the matrix of a compound made up largely of calcium phosphate, the other tending to prevent the adequate deposition of this compound, and thus to produce bone built up of comparatively soft, partially calcified tissue. The factors assisting perfect calcification are: (1) an adequate supply of calcium and phosphorus, (2) an adequate supply of vitamin D either in the food or as synthesized in the body by the exposure of the skin to sunlight or some other source of ultra-violet radiation. The factors preventing perfect calcification are: (1) those dietetic substances which induce growth without, at the same time, supplying a corresponding calcifying substance; (2) the foods which not only encourage growth but in some cases, at least, actively interfere with the retention of calcium salts in the body, and so prevent the deposition of calcium phosphate in the bone matrix.

What, then, are the foods which influence calcification? Those stimulating the formation of perfect bone are milk, cheese, butter, egg yolk, and the fat of meat and fish. All these contain vitamin D, and some of them—that is, milk, cheese, and egg yolk—are also rich in calcium and phosphorus. The chief foods hindering calcification are cereals, including bread, oatmeal, maize, rice, etc. Other foods which, by stimulating growth and not exerting a corresponding influence on calcification, tend to bring about defective bone formation, include lean meat and white fish and most vegetable fats. Vegetables and fruit seem to be more or less indifferent in their action, although in some circumstances the calcium content, especially in the case of green vegetables, may aid calcification. Sometimes green vegetables may even contain a small amount of vitamin D, especially if recently exposed to sunlight. The vitamin C content of fruit and vegetables prevents scurvy, and thus defends the bones against any scorbutic influences.

From the foregoing, it is evident that the demand for the inclusion of calcifying foods in the diet is greatest (*a*) during growth, and (*b*) when cereals are the main constituents of the diet. Since a child's consumption of food is limited, the greater the amount of bread and other cereals eaten the less likely is it that sufficient milk, eggs, suet, etc., will be consumed to ensure proper bone formation. Further, cereals are the cheapest, and therefore the most greatly consumed, articles of diet. Climatic conditions in this country are such that the baneful effect of cereals cannot ordinarily be counteracted by ultra-violet radiations. Indeed, all the circumstances, climatic, dietetic, and economic, in this country appear to be conducive to defective bone formation.

Bone Diseases due to Defective Feeding

Rickets, Late Rickets, and Osteomalacia.—When the dietetic conditions in infancy and childhood are unbalanced, as just indicated, rickets follows, and if such conditions prevail in adolescence "late" rickets may ensue. Even in the adult, when all growth has ceased, bone is not in a static condition, but is constantly being absorbed and re-formed. Thus a poor calcifying diet in the adult, extending over a long period, may result in osteomalacia, especially when there are increased calls on the mineral constituents of bone as in pregnancy. Associated with, or independently of, these pathological states, osteoporosis may arise. With advancing age, partly because of the relatively small rate of growth and partly because of some unknown factor which ensures greater stability to the bony skeleton, gross bone deformity of dietetic origin becomes rarer, so that whereas rickets and its associated deformities in early childhood are extremely common in this country, late rickets and osteomalacia are rare. Even active rickets is uncommon after the age of 4. Only in extreme poverty and in countries where the diet is greatly restricted and is almost entirely composed of cereals, as in China and India, is osteomalacia common. Rickets is still one of the greatest social evils of this country, in spite of the fact that its aetiology and methods of prevention are known. It is probably true that in London there has been a great diminution in the number of gross rachitic defects in the young during recent years, but in the industrial towns of the Midlands and North the disease is still rampant. A rickets clinic has in recent years been established in Sheffield, and there are never fewer than 500 children attending for treatment.

Defective bone formation is, however, much more widespread than is indicated by gross bone deformity, and it is probable that a very large proportion of infants and children in this country have at some time passed through a period of defective bone calcification short of florid rickets. This point has been emphasized by medical men interested in public health.[1] Other evidence showing the great prevalence of milder forms of the disease is that of Schmorl,[2] who from 1901 to 1908 examined by histological methods the bones of 386 children in Dresden

* Read in opening a discussion in the Section of Medicine at the Centenary Meeting of the British Medical Association, London, 1932.

between the ages of 2 months and 4 years, and found 345 (89.4 per cent.) with rachitic changes. In 201 (58.3 per cent.) the disease was active, in 80 (23.2 per cent.) healing, and in 64 (18.5 per cent.) healed. These figures cannot be taken as typical of the average population of children, but they do indicate a serious state of affairs, at least among hospital children, in a country where the dietetic conditions are not greatly different from those in our own. Only 41 (10.6 per cent.) were free from signs of rickets, and in some of these the disease had probably healed.

The structure of a tooth reveals the history of the processes of calcification during the whole period of development ; unlike the bones, the tooth, once formed, remains practically unchanged. M. Mellanby[3] found, on examining the histological structure of large numbers of deciduous teeth, that about 80 per cent. were imperfectly developed. Examination of the mouths of about 1,300 L.C.C. school children under 6 years of age revealed that only 1.3 per cent. had perfectly formed sets of teeth.[1]

Prevention of Rickets.—A fundamental method is to increase the consumption of milk, and especially to procure breast-feeding by properly fed mothers. Although it is probably true that the need for a large intake of vitamin D is less when the diet is wholly milk than when it is mixed, it must be remembered that the younger the child the greater is the tendency to rickets, and that many samples of both cow's and human milk do not contain sufficient vitamin D to ensure perfect bone formation in early life, even when milk is the only food ingested. For this reason supplementary dietary additions of substances rich in vitamin D are advisable for all infants and children, as well as for the nursing mother. Cod-liver oil is a specific against rickets as well as a curative agent of great potency. Only small quantities are necessary as a prophylactic, from one to three teaspoonfuls daily being ample, the small quantity being given from birth. The need for cod-liver oil is, of course, greater when the milk consumption is small and the cereal intake large. Apart from its vitamin D content, cod-liver oil is rich in at least two other dietary factors which are often deficient in the ordinary diet—namely, vitamin A and iodine. It is easily taken by infants and young children if administered by a reasonably sensible mother or nurse.

No cereals or cereal concoction ought to be given to an infant for the first eight or nine months, and even after this only in small amounts for the first two years. Cereals form far too great a part of the diet at all ages, and might well be replaced to a large extent by milk, eggs, cheese, vegetables, and fruit throughout life. The high cost of milk makes a sufficiency almost unprocurable by a large section of the population ; large-scale reduction of rickets by increased consumption of milk is therefore unlikely under present economic conditions. Nor will butter act as a substitute for milk, since in the presence of cereals the antirachitic action of butter is small. Bread-and-butter is not greatly superior to bread alone, although other factors, such as a high calorie value and vitamin A, are important attributes of butter. Butter can, however, be made much more strongly antirachitic by giving it with additional calcium ; thus butter with 10 per cent. calcium phosphate or carbonate has a powerful antirachitic action.[4] If some means could be found of making butter so that it retained the calcium of the milk a great advance in the improvement of bone formation would follow. In the case of poor people, where milk consumption is low and consumption of cereals is high, an effort should be made to increase the calcium intake. In the Sheffield Rickets Clinic, under the guidance of Dr. C. Lee Pattison, calcium phosphate (bone ash) is given to rachitic children (about 2 grams daily) as well as cod-liver oil.

There is little glory attached either to the diagnosis or to the cure of rickets, and possibly for this reason the medical profession shows comparatively little interest in this scourge. Only when the public conscience is aroused will its prevention and its elimination from our midst follow. It is doubtful whether this conscience will be sufficiently stirred either by the sight of enlarged epiphyses, delayed closing of fontanelles, or even bent legs, but if every woman and man grasped the fact that perfectly formed teeth could be ensured by the same simple means of feeding the young, a great advance in the prevention of rickets might naturally follow. Also every woman ought to be made to realize the troubles of childbirth that are in store for those females who have been allowed to develop rickets in childhood.

Late Rickets and Osteomalacia.—Both these conditions can be cured by the treatment specific for rickets. Thus cod-liver oil or some other source of vitamin D such as irradiated ergosterol is curative, especially when the diet is improved in its mineral salt content. Since it is much more difficult to produce defectively calcified bones in the adult than in the infant and young child, it is doubtful whether a simple vitamin D deficiency is the cause of these conditions. There is little doubt that the calcium intake is also very deficient, so that the bones lose their stores of this substance. The demands of the foetus and infant for calcium, phosphorus, and vitamin D, via the placenta and the mammary gland, no doubt account for the increased incidence of osteomalacia in child-bearing women. Hunger osteomalacia may be common in those living under famine conditions.

The fact that osteomalacia is most often found in countries where there is abundant sunlight is a curious commentary on modern discoveries concerning the effect of ultra-violet rays on bone calcification, and indicates the preponderating influence of diet. If osteomalacia in Indian women were confined to those living in purdah, this could be well understood, but according to Wilson[5] women when working on the land and exposed to much sunlight also develop this disease. The diet of these women consists almost entirely of cereals. There are some who think that osteomalacia in an incipient form is more common in England than is generally recognized. It may well be so, and in women complaining of back and thigh pain, especially if associated with bone defect, the possibility of osteomalacia ought to be considered. It is certain that a woman in pregnancy ought to be so fed that the demands of the developing embryo should not make it necessary for the maternal organism to sacrifice its own chemical stores, whether these be calcium, phosphorus, iron, iodine, vitamin A or vitamin D, or any other substances essential for health. Many of the ills associated with pregnancy could be thus avoided. I have seen in this country two cases of osteomalacia in childless women produced by restriction of diet (on medical advice) because of dyspepsia. In osteomalacia the serum calcium is usually low (5 to 7 mg. per 100 c.cm.) and rises rapidly on the administration of vitamin D and calcium (Maxwell[6]). Tetany is a common accompaniment of osteomalacia, but responds to the dietetic treatment of the disease.

Before leaving the subject of diet and calcification three further practical points may be mentioned.

The Use of Standardized Vitamin D.—Since there is now an international unit of activity of vitamin D, all preparations which claim to contain this substance ought to be standardized, and the medical profession should take advantage of this fact. An ordinary sample of cod-liver oil contains about 100 units per c.cm., but good samples may contain up to 250 units per c.cm. Since the isolation of vitamin D in the form known as

calciferol, preparations of intense activity are procurable, but it is probably not desirable to use those of greater strength than 3,000 units per c.cm. for ordinary purposes.

Hypervitaminosis D.—The danger of this condition, due to the administration of potent preparations of vitamin D, is small if the infant or child also has plenty of milk. There is, however, a real danger of producing hypervitaminosis, with calcification of the kidney vessels and tubules, if concentrated preparations are given to marasmic infants and children not taking a reasonable amount of milk and other food. In my experience, even 1,500 international units of vitamin D daily in the form of irradiated ergosterol bring about curative changes at the epiphyses of rachitic children when the diet is not in itself curative and the children are not exposed to direct sunlight. This dosage produces a relatively slow rate of healing ; 3,000 units is a more effective dose, and I should regard 5,000 units as the maximum required for a cure. To cure rickets under ordinary dietetic conditions 20 c.cm. or 6 drachms of cod-liver oil containing (on an average) 2,000 to 3,000 units of vitamin D are sufficient. These figures are given as a general guide for avoiding hypervitaminosis, but it is always desirable to see that the diet itself is good when vitamin D is given in large doses. In marasmic children it is probably better and safer to give cod-liver oil in small doses at first and to increase them gradually rather than to give irradiated ergosterol.

Osteotomy.—With improved control of rickets and its resulting bone deformities, the need for osteotomy should almost have disappeared. So long as a child is growing, a good diet rich in vitamin D, calcium, and phosphorus will, if continued, correct most gross bone deformities of the limbs ; treatment for a year or more is generally necessary in such cases. Whether pelvic deformity in childhood also recovers under these conditions I am unable to say, but it is a subject which merits investigation. Osteotomy to correct bone deformity due to rickets should only be performed when growth is ceasing or has ceased, and the operation ought to be followed by a diet of high calcifying qualities.

Generalized Osteitis Fibrosa Cystica (von Recklinghausen's Disease)

The Parathyroid and Bone Structure.—If the problem of rickets is generally regarded with indifference, especially from the prophylactic aspect, which matters most, there is certainly no indifference to the problems of bone defects associated with parathyroid abnormality. The diagnosis and treatment of hyperparathyroidism is a matter of great interest at the present moment. The subject has been ably reviewed recently by Dr. Donald Hunter,[7] who is with us to-day ; it is therefore unnecessary for me to say much. Our present knowledge is based on work directed from all angles of medical research. This includes the observations of the morbid anatomists—von Recklinghausen,[8] Askanazy,[9] Erdheim,[10] Schmorl,[11] and Dawson and Struthers[12] ; the experimental work of MacCallum and Voegtlin,[13] Collip,[14] and Jaffe and Bodansky[15] ; and the clinical experiences of Mandl,[16] Aub and his colleagues,[17] and Hunter.[7] Many other names could justly be added to this list.

The diagnosis of generalized osteitis fibrosa cystica calls for complete laboratory equipment, and involves radiography, blood chemistry, and, when possible, a chemical balance sheet of calcium and phosphorus intake and output. The rarefaction of the bones, sometimes with osteoclastomata and cysts, which may or may not expand the bone itself, the high serum calcium (over 10 mg. per 100 c.cm.), the low plasma phosphorus (below 3 or 4 mg. per 100 c.cm.), the high blood phosphatase, the large loss of calcium via the urine, even when on a low calcium diet—all these points must be considered in the diagnosis. I have attempted to draw up a table giving in brief the main points which differentiate generalized osteitis fibrosa cystica from such conditions as osteitis deformans (Paget's disease), osteomalacia, and healed rickets with deformity.

It is important also to note that *localized* osteitis fibrosa is not necessarily associated with the above-described blood and urinary changes (Hunter[7]), nor with hyperplasia of the parathyroid. It was probably for this reason that Schmorl[18] only found four cases of parathyroid enlargement in twenty-five patients suffering from osteitis fibrosa. Nor are all cases of parathyroid hypertrophy associated with osteitis fibrosa, for in forty-seven such cases Hoffheinz[19] found only twenty-seven suffering from bone abnormality, including seventeen cases of osteitis fibrosa, eight cases of osteomalacia, and two cases of rickets.

The removal of the enlarged or adenomatous parathyroid in generalized osteitis fibrosa, whether surgically or by *x*-ray therapy, as recently practised by Merritt,[20] has dramatic results, the most important immediate changes being the reduction or disappearance of the disabling pain and weakness and the diminution of the blood and urinary calcium. There is some difference of opinion

Some Indications for Differential Diagnosis of Some Bone Diseases in the Adult

	Radiographic Examination	Blood Examination			Urinary Examination	Time of Onset
		Calcium in Serum	Phosphorus in Plasma	Phosphatase		
Generalized osteitis fibrosa cystica	Involves many bones. Multiple cystic areas with little sclerosis. Cysts and osteoclastomata may extend along axes or may expand corticalis. Diminished density of bone shadows	High, usually above 13 mg. per 100 c.cm.	Low, usually below 3 mg. per 100 c.cm.	High	Calcium and phosphorus several times as high as normal, even on low calcium diet	Early adult life and later—20 up to 55
Local osteitis fibrosa	Often only one bone affected. Spacing out of lamellae to form cystic areas	Normal	Normal	Normal	Calcium and phosphorus excretion normal	Chiefly in adolescence
Osteitis deformans	Bones thickened. May affect only one bone, but usually extends to others. Skull may be thickened and woolly. Pelvis often first affected. Bone structure eventually lost, and acquires more or less uniform density	Normal	Normal	High	Calcium and phosphorus excretion normal	Later life—45 to 65
Osteomalacia	General rarefaction of bones and structure to some extent lost. Shafts of long bones reduced in girth, and cortex diminished. "Drumstick" appearance of long bones. Coxa vara, increased convexity of sacrum, sclerosis, and triradiate pelvis	Low (5 to 8 mg. per 100 c.cm.), but rises on giving vitamin D and calcium	Usually low (2 to 4 mg. per 100 c.cm.)	High, but diminishes on giving vitamin D and calcium	Usually high calcium excretion	Often associated with pregnancy or history of famine conditions
Healed rickets with deformity	Bones deformed, but otherwise normal	Normal	Normal	Normal	Calcium and phosphorus excretion normal	History of deformity in childhood or adolescence

as to the bony changes following operation, but it must be remembered that often the bones may have to be completely rebuilt, and therefore only a slow reversion to normal structure can be expected in severe cases. Tetany commonly follows operative removal of the hyperplastic parathyroid, but this condition can be controlled by parathyroid extract. This sequel is difficult to understand, especially as removal of the gland, although reducing the serum calcium, still leaves it near the normal figure. It is interesting to note that Johnson[21] has recently described tetany in puppies *following* the *cessation* of administration of parathyroid extract which had been given to produce the bone changes characteristic of generalized osteitis fibrosa. This seems comparable to the tetany following removal of the gland in osteitis fibrosa, and ought to assist in affording a solution to this problem.

There is still much to be learnt about this condition—the cause of the parathyroid hyperplasia often of only one gland, the reason why a more general hypertrophy of the parathyroid glands is associated sometimes also with other defective conditions (for example, osteomalacia and rickets), the origin of the pain which is so disabling, and of which such complaint is made by patients, the action of parathyroid hormone on the blood and on the bones, and especially its relation to osteoclastic activity, and, finally, the reason why the tendency to tetany following operation diminishes after the first few days. Clinical investigations and results of experimental work on animals have made it absolutely clear that parathyroid enlargement and hyperactivity is the primary cause of generalized osteitis fibrosa, but a subject has been opened up which calls for the combined efforts of physiologists, pathologists, and, indeed, of all whose object it is to add to the understanding of biological problems of practical interest.

Osteitis Deformans (Paget's Disease)

Ignorance of the aetiology of osteitis deformans is at present probably the greatest hiatus in our knowledge of bone defect. This disease, in my experience, is much more common than generalized osteitis fibrosa, and the history of its discovery by Paget[22] makes a special call on English investigation. The morbid anatomy of osteitis deformans, especially in its early stages, is so similar to that of osteitis fibrosa that it might be supposed that here also hyperparathyroidism plays a part, but there is no evidence that such is the case. This disease more usually attacks older people than does osteitis fibrosa ; it is more chronic in nature, and the absorption of bone and its new formation keep pace better than in osteitis fibrosa, where rarefaction predominates. Undoubtedly there is some aetiological factor in common between osteitis fibrosa and osteitis deformans, but it has not yet been identified.

It has been my practice for some years to treat this disease by giving a highly calcifying diet, including much milk and egg yolk together with cod-liver oil. Although absorption of bone in osteitis deformans is active, the tendency to recalcification and laying down of new bone is still great. The encouragement of this recalcification by diet seems to me, therefore, to be the right line of treatment while we are ignorant of the aetiology of the disease. In one case where the only bone affected is the femur shaft, this form of treatment has continued for six years. There has been no spread of the disease to other bones during this time, and although the femur shaft has remained defective in structure and calcification, the patient has continued at work throughout. Unfortunately osteitis deformans generally attacks poor people, who find it difficult to procure the right type of feeding for long periods.

The calcium and phosphorus content of the blood is within normal limits in this disease, but the blood phosphatase is high (Kay,[23] Roberts[24]). In this connexion it may be well to point to the advantage of using the shorter method of estimating the blood phosphatase as described by Roberts[24] or that of Jenner and Kay[25] more recently published.

Renal Rickets

The Kidneys and Bone Structure.—Renal rickets can probably be classed with osteitis fibrosa as being due, not to diet, but to some derangement of the functional activity of an organ (in this case the kidney) and as having no direct relation to ordinary infantile rickets. The presence of Dr. Barber and Dr. Parsons to-day makes it unnecessary for me to dwell on this subject, the main interest of which lies in the facts that the rachitic changes in the bones are associated with sclerotic kidneys and that the bones do not respond to treatment with vitamin D and a high calcifying diet. On the basis of the first principle in all research—namely, to treasure the exceptions—it would appear that greater knowledge of this interesting condition is imperative, for it would probably throw much light on the action of vitamin D and other factors influencing bone calcification. Parsons[26] has laid special stress on the importance of the inability of the kidneys to excrete phosphorus in renal rickets, an aspect of the subject which is of great interest. There are some clinical indications that the kidneys and parathyroid glands are closely related in their actions; experimental evidence on this point has recently been given by Cowell in a communication to the Physiological Society (unpublished). The relation of the kidneys to calcium metabolism seems to be a promising line of investigation.

Conclusions

I have now dealt briefly with the more commonly recognized bone diseases whose origin is dependent on metabolic disorders. Coeliac rickets and osteoporosis associated with hyperthyroidism have not received the attention they deserve. Bone infections such as osteomyelitis and tuberculosis have not been considered, nor has any attention been given to bone tumours, although the relation of the osteoclastomata of osteitis fibrosa to some of the benign giant-celled bone tumours well merits consideration (Dawson and Struthers[12]).

As the result of animal and clinical investigations made in recent years: (1) rickets, late rickets, osteomalacia, and bone changes associated with scurvy can now be prevented and cured ; (2) generalized osteitis fibrosa cystica can be cured or, at least, its progress can be stopped and great improvement in the general condition brought about ; (3) most important of all—perfect formation of bones (and their allied organs, the teeth) can be produced in infants by proper feeding.

Nothing is yet known as to the cause of osteitis deformans (Paget's disease) although its progress can possibly be retarded by treatment. Renal rickets, fragilitas ossium (except its hereditary factor), and achondroplasia still remain enigmas.

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SOME CONSIDERATIONS ON THE INFLUENCE OF COPPER AND MANGANESE ON THE THERAPEUTIC ACTIVITY OF IRON*

BY

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The last few years have seen the emergence of two fields of investigation which, though originally independent, are now beginning to unite. In the first place, modern methods of analysis have shown that in addition to the elements traditionally incorporated in the structure of protoplasm, others, principally metallic, occur with constancy in animal tissues.

This analysis at first made use of chemical methods, but as many of these elements are present only in minute traces the spectrograph has been found to have many advantages, particularly as a means of qualitative research. Using an arc spectrum, Zbinden[1] found copper, manganese, tin, silver, titanium, chromium, and zinc widely spread throughout the body. By the method invented by Ramage,[2] employing a flame spectrum, copper, manganese, rubidium, silver, and strontium have been found in human beings,[3] while Fox and Ramage[4] obtained similar results in invertebrates, though the range of elements found was wider and in many cases included nickel and cobalt. The advantage of the spectrograph in this type of work can be seen in the case of the eye, where the very unexpected observation was made that the choroid of cattle regularly contains barium in amounts that increase with age.[5] It is clear that certain elements, particularly copper, manganese, zinc, and rubidium, occur with great constancy in human tissues. This is especially the case with copper, which was found in every one of 500 specimens examined by the method of Ramage; so that this element at any rate may be regarded as a universal and essential constituent of protoplasm. The first reaction to such findings is to regard these elements as contaminants rather than as substances having physiological significance. The second series of investigations referred to above has, however, begun to show that at any rate some of them have functions in the body which render them necessary to life, although they are only necessary in minute quantities. Thus in 1928 Hart, Steenbock, Waddell, and Elvehjem, showed that without the presence of an adequate amount of copper the body is unable to utilize iron to form haemoglobin.[6] More recently Orent and McCollum[7] and Kemmerer[8] have found that manganese is essential to the processes of reproduction. It is in the light of these researches that I wish to advance a few considerations as to how copper and manganese may influence the therapeutic activity of iron, a full review of the subject being beyond the scope of this paper.

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COPPER IN NUTRITIONAL ANAEMIA

The experiments of Hart and his co-workers at Wisconsin showed that carefully purified inorganic iron was ineffective in the cure of the nutritional anaemia of young rats caused by the iron deficiency resulting from a whole-milk diet. When accompanied by small amounts of copper (0.025 mg. a day)[6] this pure inorganic iron could be used as the sole source of the iron required for the cure of the anaemia, the haemoglobin being rapidly regenerated in the presence of copper. They further found that copper was unique in this property, and could not be replaced by other metals. A few workers such as Titus, Cave, and Hughes,[9] and more recently Myers and Beard,[10] while not denying that copper is the most active supplement to iron, have stated that other elements, including manganese, are also effective. Hart and his colleagues have reaffirmed their original position,[11] which has also been confirmed by other workers. Thus, Orten, Underhill, and Lewis,[12] using glass cages in order to prevent the rats obtaining traces of metal by gnawing the cages, found that copper was the only effective metal, and that manganese, in particular, was quite inert in the formation of haemoglobin. These experiments of Hart and his colleagues are fundamental in demonstrating that the traces of copper so consistently found in animal tissues have at any rate one definite physiological function. It is certain that others remain to be discovered. An obvious clinical application of their work lies in the nutritional anaemia of infants, which has recently been fully described by Helen Mackay.[13] This anaemia, like that of the experimental rats, is characterized by a deficiency of haemoglobin due to iron starvation, and it is a natural inference that copper might be of similar value in this condition. Numerous observations have been reported, by Parsons,[14] Josephs,[15] Schiff,[16] and others, and while there have been negative reports, the general trend is to show that in infants the addition of a small amount of copper to the iron preparation used does accelerate the production of haemoglobin. Here, as in so many other cases, it is difficult to transfer the comparatively simple results of controlled experimentation into the more complex field of clinical medicine. Thus it would appear from the work of Parsons on the value of yeast extracts that there is a vitamin as well as a metallic deficiency in this type of anaemia, and it has been shown[17] that copper may occur as an impurity in all the preparations of iron in therapeutic use, its presence having been demonstrated in about 80 per cent. of the samples tested. There is, however, sufficient evidence to justify the use of small amounts of copper in addition to the iron needed for the treatment of these babies. Transferring the figures from the experiments on rats to the human being on a basis of weight for weight, the human baby would appear to need about 0.5 mg. copper per diem.[18]

Its Mode of Action

The usual explanation of this action of copper has been that it is a catalytic one. Josephs[19] has recently published some very important work which carries our knowledge a stage further, and which should be borne in mind when copper is employed as a therapeutic adjunct to iron in children. He fed a series of rats on: (1) milk alone, (2) milk plus 0.5 mg. iron per diem, and (3) milk plus 0.5 mg. iron plus 0.1 mg. copper per diem. The rats were killed at various ages, during and after the nursing period, and the total amount of iron in the whole body was found by chemical analysis. The haemoglobin percentage

being known, the total haemoglobin was calculated from a formula correlating weight and blood volume. On the assumption that haemoglobin contains 0.34 per cent. of iron[20] the percentage of the total iron of the body present as haemoglobin could then be calculated.

The results are of great interest. It was found that in Groups (2) and (3) the retention of iron averaged about 10 per cent. of the intake, and that copper had no influence on the degree of retention of iron. The effect of copper was to increase the proportion of retained iron found as haemoglobin, so that rats fed on copper plus iron had smaller amounts of iron in the tissues than had rats fed on iron alone. Indeed, these rats fed on iron and copper together had, within the limits of experimental error, the same amount of tissue iron as had those fed on milk alone, indicating that under the influence of copper 100 per cent. of the retained iron was being used for the formation of haemoglobin. The tissue iron consists of two moieties—(*a*) the functional iron, which is essential to life and is mostly located in the nucleus in organic combination, and (*b*) a reserve store of iron, which is chiefly found in the liver. In rats fed on milk alone there is from birth a steady drop in the total tissue iron of the body (as the reserve store provided during foetal life is used up), until a steady level is reached, representing the functional iron necessary for the life of the tissues. Since the store is depleted, not only by the call for iron for haemoglobin but also for the growing tissues, there is a progressive diminution in the amount available for the formation of haemoglobin, resulting in the development of anaemia. When this mechanism is exhausted the level of functional iron in the tissues is maintained at the expense of growth.

Practical Applications

It is to be noted that the rats receiving copper plus iron resembled those on a milk diet alone in that there was no reserve store of iron, since all the iron retained from the food was utilized for the formation of haemoglobin. It is therefore probably advisable when giving copper to give larger doses of iron than would otherwise be given, so as to ensure that there is an adequate supply of iron for the two purposes of growth and haemoglobin formation. Mackay's work has shown that there is a correlation in infants between rate of growth and haemoglobin level—the faster the rate of growth the lower the haemoglobin level—owing, of course, to the demands of the new tissue for nuclear iron. It is a noteworthy fact that young growing tissues appear invariably to have a higher copper content than older tissues (for example, teeth from the first dentition of a child gave distinctly stronger copper lines on spectrographic examination than did adult teeth,[3] and Bodansky, by chemical examination, found foetal brain to be richer in copper than was adult brain[24]).

The results of our general spectrographic survey of human tissues led Ramage and myself to suspect that copper plays an important part in the phenomena of growth, and, if this is the case, the giving of copper to an infant may cause a stimulation of the demand for iron for purposes of growth and haemoglobin formation. If insufficient iron is being given, this may lead to a relative shortage. It is probably largely a question of the relative dosage of the two metals, of which little is known, since it is difficult to transfer the experimental figures in animals to human material. At any rate, it is conceivable that some such explanation as this may underlie the failure of some clinicians to obtain results with copper, and it is at any rate advisable, when giving copper to an infant, to make sure that adequate doses of iron are given in addition. In fact, this work provides a further argument in favour of the modern method of employing iron in larger doses than formerly, since at least 80 per cent. of the iron preparations used themselves contain copper as an impurity.

Storage of Copper in Foetus and Infant

The fundamental importance of copper in the animal economy is shown by the fact that at birth the infant is provided with a large reserve of it in the liver. An extensive series of human livers has been investigated spectrographically, from this point of view, in conjunction with H. Ramage and W. Sheldon. By their courtesy I am able now to refer to this material, which is being prepared for publication.

It would appear that copper and iron are the only metals stored as reserve material in the liver during foetal life (it should be mentioned that zinc is very difficult of detection by the flame spectrum used, and no opinion is offered with regard to this metal). The values rise steadily during foetal life and reach their peak at birth, when figures as high as 0.06 per cent. (dry) for copper and 0.4 per cent. (dry) for iron may be obtained, which represent more than ten times as much as is found in adult life. After birth these figures drop steadily until the stable value is reached, at the age of 12 to 18 months, which then persists throughout life. A curious feature is that once this level has been reached the amount of individual fluctuation from the average figure is nothing like as much as is found between birth and the attainment of the adult level, due to the fact that though there is in every case a store of copper and iron provided to tide the child over the nursing period, the amount of this initial store is subject to a very wide degree of variation. This is probably an important point, since owing to the small amount of these metals in milk the infant depends on this store to prevent the development of a nutritional anaemia. It is to be presumed that a child with a poor initial reserve runs a much greater risk of developing anaemia, and if the suggestion already made is true—that copper may be an essential factor in growth—the growth of such a child may be retarded. The reserve store is, of course, acquired from the mother, and it is possible that by ensuring that she receives an ample supply of these metals in her diet during pregnancy the incidence of anaemia in infants might be lessened.

Effect of Milk Diet

It is of some interest to compare the amounts of copper and iron that an infant receives in the milk during the nursing period with that provided as a reserve store at birth. In our series, the liver at birth contained an average of about 7 mg. of copper and 50 mg. of iron. Human milk contains about 0.25 mg. of copper[18] and 2 mg. of iron per litre. On this basis a breast-fed infant receives during the first nine months of life somewhere about 50 mg. of copper and 600 mg. of iron. At first sight this would suggest that the foetal store is of much less importance than the amount provided in the milk. It is, however, not known how much of this supply can be absorbed and retained. It is certain that there is a steady loss of copper from the body even in foetal life. Foetal bile and foetal gall-bladders contain considerable amounts of this metal, and that this probably represents a path of excretion is shown by the fact that meconium contains copper in recognizable amounts. On the basis of Josephs's observation that about 10 per cent. of the iron is retained, this would make the useful contribution from the milk about 40 mg. of iron and 5 mg. of copper, an amount closely similar to that provided in the liver at birth. The importance of the amount found in milk receives an added confirmation from a teleological point of view in that human milk is richer in both copper and

iron than cow's milk—evidently an adaptation to the longer period during which the infant is entirely dependent on milk alone. The same mechanism is apparently at work in the guinea-pig, which has practically no reserve store, since this animal supplements its nursing diet almost from birth. It is worth pointing out that the copper content of milk cannot be increased by feeding the mother with copper. This has been shown by Elvehjem[21] in the case of cow's milk, and it also applies to manganese.[22] Elvehjem has also found that the percentage of copper in the egg cannot be increased by feeding copper to the hen. We know, however, nothing of the reverse. Whether a maternal diet that is deficient in copper leads to a milk that is also low in its copper content or whether this figure is maintained at the expense of the maternal organism is unknown, but it is obviously a point that requires further work. It would appear, however, that the infant depends on both sources for its supply of copper —the reserve store in the liver and that provided by the milk—and the causes of deficiency in each of these need further investigation.

It is impossible as yet to say whether the anaemia of adults characterized by a haemoglobin deficiency is connected with a shortage of copper in the body as well as of iron. No post-mortem material from which a direct knowledge of the copper content would be obtained has been available, and the estimation of the therapeutic value of copper as a supplement to the large doses of iron employed in its treatment is rendered exceedingly difficult both by the great variations in the extent to which copper occurs as an impurity in the therapeutic preparations of iron, and by the considerable amounts of copper taken in with the food.

Variations in Blood Copper

Before leaving the subject of copper there is one curious feature that is worth mentioning. Since copper is an essential factor in the formation of haemoglobin, one would expect that cases of anaemia characterized by deficiency in haemoglobin might show a deficient amount of copper in the blood. (Copper occurs in the blood both in the red cells and in the serum. This has been found by all workers, though there is disagreement as to which has the greater amount.) Although there has been as yet no work directed to this subject, there are a number of isolated observations in the literature which appear to show that the reverse is actually the case, and that many instances of anaemia show a definite increase in the copper content of the blood. Thus Gorter, Grendel, and Weyers[18] found that in the nutritional anaemia of children the copper content of the serum averaged 2.1 mg. per litre as against 1.4 mg. per litre for "convalescents." Warburg and Krebs[23] found in birds that three to four days after severe bleeding the copper content of the serum might be raised fourfold or fivefold. In a series of twenty-eight bloods, Sheldon and Ramage[3] found that the strongest copper lines of all were given by a case of very severe anaemia of pregnancy, while the next strongest were given by a case of severe haemorrhage of puberty in a girl. (The copper lines were also very strong in a case of carcinoma.) In a case of pernicious anaemia, on the other hand, the copper lines were only just visible. It is hard to say what these findings may mean, and in any case they need confirmation on an extended scale. It may be that all the available reserves of copper are being mobilized to cope with the demand for new haemoglobin or that the figure is high because the copper, though mobilized, cannot be utilized by the body owing to the absence of a further factor, such as some vitamin lack. The observation serves at any rate to show how wide are the gaps in our knowledge of the physiological action of copper.

Manganese: Distribution and Functions

Manganese occurs in many of the organs, but is chiefly concentrated in the liver, kidneys, pancreas, and suprarenals. The liver has the greatest and most constant supply, and the amount found averages about 0.0008 per cent. of the dry weight. It also occurs in blood, and we found it spectrographically in fourteen out of twenty-eight specimens examined.[3] It was invariably found in the serum and never in the red cells, though Zbinden[1] reports it as occurring in the latter. As the arc spectrum employed by him is more sensitive than the flame spectrum, this presumably means that at any rate its concentration is very much greater in the serum. No particular variations were found in the bloods of patients with various diseases, nor did the amounts appear to be affected by the presence of an anaemia. Unlike copper, the amount of which in the blood is slightly increased during pregnancy, manganese was unaffected.

A further marked contrast between the behaviour of copper and manganese is provided by the study of the liver of the newborn. A preliminary survey of our unpublished results shows clearly that there is no reserve store of manganese provided during foetal life to tide the infant over the nursing period. The manganese content of the liver rises during foetal life and reaches its maximum during the last three months, but this maximum is the normal adult level of about 0.0008 per cent. of the dry tissue, and once this has been attained it apparently remains at this figure throughout life. Nature therefore makes no effort to give the newborn a special supply of manganese, and this fact is, I think, very strongly in favour of the view of Hart that the functions of manganese are not concerned in the formation of haemoglobin.

Another point of view is provided by the extremely careful work of Orent and McCollum.[7] Using a spectrographic control as to the purity of the food, they fed rats on a diet deficient in manganese. (Incidentally it may be pointed out that this is the only satisfactory means of arriving at a knowledge of the functions played by these "trace" elements. Merely to feed animals on the element in question leads nowhere, as minute quantities only are required by the body, and amounts added in excess of this throw no light on its essential function.) Orent and McCollum found that manganese was essential to the life of the animal, and that deprivation of the metal led in time to death. The lack of manganese caused a failure of function of some of the endocrine organs, the male rats evincing atrophy of the testis and the female rats a lack of normal readiness to suckle their young, features which the authors explain by the assumption that manganese is essential for the production of internal secretion by the anterior pituitary. Kemmerer, Elvehjem, and Hart[8] also found that there was a close relation between lack of manganese and the reproductive processes, as mice failed to ovulate normally in the absence of this metal. It is to be noted that Orent and McCollum in their experiments were able to confirm the work of Hart that manganese plays no part in the utilization of iron to form haemoglobin.

Thus, while there is abundant evidence that copper is an essential factor in the formation of haemoglobin—sufficient, indeed, to justify the giving of small amounts as a supplement to the iron used in the treatment of anaemia—the weight of the available evidence is heavily against the view that manganese has a similar function. It may be mentioned that in any case all the preparations of iron in common use contain manganese as an impurity,[17] and it sometimes occurs in quite large amounts—exceeding 0.02 per cent. Manganese is probably essential to the proper function of the endocrine organs, particularly

those concerned directly with reproduction. The elucidation of the physiological part played by these and other metals found constantly in minute traces in the body offers a promising field of work.

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DIPHTHERIA IN THE DUNEDIN HOSPITAL, 1921-31

A STATISTICAL AND CLINICAL STUDY

BY

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In recent years there has been a disconcerting recrudescence of diphtheria in many parts of the world. Twenty-two out of twenty-eight European countries record this experience. Coincidentally with increased morbidity several countries, notably Germany and Russia, have experienced a great increase in case mortality. This seems to be due to a more toxic form of disease, which is proving intractable to the usual doses of antitoxin, and which is attended by severe cardiac and nervous complications.

In New Zealand since 1912, and particularly since 1921, diphtheria incidence has steadily declined. Thus in 1921 notifications were 2,611 (21 per 10,000 of mean population) and deaths 107 (0.87 per 10,000), whereas in 1930 notifications were 1,440 (10 per 10,000) and deaths 58 (0.41 per 10,000). There was no evidence of undue toxicity until 1929, when a few cases of the new type occurred in the Dunedin Hospital. The occurrence of more cases of the kind in 1930–1 has given occasion for this report, and to illustrate it we have to review the incidence of diphtheria in the Otago Hospital District and in the Dunedin Hospital.

MORBIDITY DATA

For the period 1921–31 inclusive the total number of cases notified in Otago was 1,319, the population in 1921 being 137,062 and the estimated population in 1931 152,600. Of these cases 847 (64.2 per cent.) were admitted to the Dunedin Hospital. (In Otago, and in New Zealand generally, practically 100 per cent. of notified cases are admitted to hospital.) The annual numbers and rates are shown below.

TABLE I.—*Number of cases of diphtheria notified in the Otago Health District during the period 1921–31, rate per 10,000 of population, and number admitted to the Dunedin Hospital.*

Year	Cases of Diphtheria Notified in Otago	Rate per 10,000 of Mean Population	Cases of Diphtheria Admitted to Dunedin Hospital	Percentage of Total Admissions
1921	356	25.60	225	8.33
1922	149	11.02	135	5.08
1923	70	5.05	55	2.04
1924	190	13.40	168	5.55
1925	147	10.50	84	2.03
1926	211	14.90	68	1.67
1927	29	2.05	15	0.38
1928	15	1.02	4	0.09
1929	12	0.81	4	0.09
1930	43	2.90	32	0.75
1931	97	6.50	57	1.33
Total ...	1,319	—	847	2.11

This table shows that the greatest incidence was in the years 1921, 1922, and 1924, and that a notable fall occurred in the years 1927, 1928, and 1929. During the period 1921–4 Schick testing and active immunization was carried out in Otago, and some 1,250 children were immunized. The work was done by students in the Preventive Medicine Class at the University of Otago, with the consent and close co-operation of the Health Department. We venture to assume that the 1927-9 decline in incidence was in part due to this work, and support is lent to this assumption by experience at a school known as the North-East Valley School. This school was fully immunized in 1927; a small outbreak occurred there in 1930, but the disease was confined to children who were below the school age in 1927. The unfortunate Bundaberg disaster of January, 1928, in which twelve out of twenty-one children inoculated for diphtheria died, led to the temporary suspension of diphtheria immunization in Otago.

AGE INCIDENCE

Table II shows that the largest number of cases in our series occurs in the 5–15 age period, but that 34 per cent. of the total cases occurred in the age group 15 and over.

TABLE II.—*Age distribution of diphtheria cases in the Dunedin Hospital and deaths for the five years 1927–31.*

Age Period in Years	Total Cases	Total Deaths	Age Period in Years	Total Cases	Total Deaths	Age Period in Years	Total Cases	Total Deaths
0-1	1	0	5-6	5	0	15-20	14	0
1-2	0	0	6-7	6	1	20-25	10	0
2-3	5	2	7-8	5	0	Over 25	14	0
3 4	8	2	8-9	7	0			
4-5	6	3	9-10	9	0			
			10-15	21	2	Total ...	38	0
Total ...	20	7	Total ...	53	3	All ages	111	10

It is usually stated that diphtheria occurs chiefly in children under 15 years of age, and that the maximum frequency is reached between the second and fifth year. In a recent study by Goodall, Greenwood, and Russell

(1931), over 91 per cent. of a series of 110,745 cases occurring in the London Metropolitan Asylums Board hospitals were in children under 15 years.

Case Mortality

There has been a disquieting increase in case mortality during the last three years as shown in Table III, where the figures for the two periods 1921–8 and 1929–31 are contrasted.

Table III.—*Case mortality for diphtheria in the Dunedin Hospital for 1921–8 and 1929–31.*

Period	Number of Cases	Number of Deaths	Case Mortality
1921–28	754	12	1.59
1929–31	93	11	11.82

The interval between onset of disease and time of administration of serum is much the same in both series; but in 1929–31 the dose of antitoxin was much larger. Until 1930 the usual dose was from 4,000 to 10,000 units, but during 1930–1 we found that with some patients doses even four and five times as large were ineffective. At first we doubted the potency of our serum, but two brands tested on guinea-pigs gave full protection from bacilli obtained from our worst cases.

Observations in other countries show that where morbidity rates are low case mortality rates are high. Bulgaria, with a morbidity rate of 2.9 per 10,000, has a case mortality of 14.6. Rumania, with a morbidity of 1.8 per 10,000, has a case mortality of 16.2. Present knowledge gives no indication of the cause of this case mortality. As a working hypothesis we assume a fluctuation in the virulence or toxigenicity of the bacillus; but the important changes which occur in the herd immunity of the district cannot be ignored, nor can they be assessed accurately. Table II shows that the fatality rate is highest in the age period 0–5 years when 70 per cent. of the deaths occur.

Seasonal Fluctuations

Table IV shows the seasonal fluctuations in cases admitted to the Dunedin Hospital during 1921–31.

Table IV.—*Seasonal incidence of diphtheria in Dunedin Hospital 1921–31.*

	Summer		Autumn		Winter		Spring		Total
	A	B	A	B	A	B	A	B	
1921	125	51	39	17	19	8	42	19	225
1922	53	39	28	21	25	19	29	21	135
1923	15	27	14	25	17	31	9	16	55
1924	72	43	4	2	62	37	30	18	168
1925	20	24	17	20	24	29	23	27	84
1926	34	50	10	15	9	13	15	22	68
1927	6	40	3	20	3	20	3	20	15
1928	2	50	0	0	1	25	1	25	4
1929	1	25	2	50	1	25	0	0	4
1930	2	6	16	50	13	41	1	3	32
1931	7	12	34	60	16	28	0	0	57
Total	337	40	167	20	190	22	153	18	847

A=Number of cases; B=number of cases expressed as a percentage of the annual diphtheria admissions.

Seasonal fluctuations are remarkably constant in Europe, America, Africa, and Japan, mid-summer being the period of lowest prevalence. Incidence increases with the advent of cold weather, and reaches its maximum in mid-winter. Australia, on the other hand, shows a summer peak and a winter drop. As in Australia, summer incidence in New Zealand is definitely the highest, but the winter drop is much less pronounced. Dunedin is in the zone of the prevailing westerlies, and autumn is distinctly warmer than spring. This departure from the seasonal fluctuations in northern latitudes may be due to climatic conditions, but the point requires further investigation.

Form of Disease: Antitoxin Dosage

Clinically the small epidemics of 1930–1 have been remarkable for the general severity of the disease and for the large doses of antitoxin required. Thus eighteen patients coming under treatment on the second day of the disease received an initial dose of 24,000 units; eleven first treated on the third day received 64,000 units.

One of us (H. W.) has had experience (1925–6) of epidemic diphtheria in the practice of two hospitals in Sydney. He is convinced that some of our cases were exceptionally malignant. While most of them were of the familiar type, with limited membrane, slight toxaemia, little inflammatory reaction or glandular enlargement, and rare complications and ready response to antitoxin, in this particular type the membrane was widespread, invading the palate or pharynx, the toxaemia was severe, inflammatory reaction was pronounced, glandular enlargement and swelling of the neck were great, the breath was fetid, myocarditis, albuminuria, and paralysis were frequent, and there was no response at all to antitoxin in ordinary doses. These two separate clinical types of the disease were distinguished by Anderson and his collaborators (1931), and our 1930–1 cases conform to their description. These authors further claim to have correlated the clinical types with separate forms of the bacillus recognizable in the laboratory. We have noticed that the severe cases in this series have been associated with a shorter, less granular type of bacillus, but we have not sufficient data to permit the recognition of *B. diphtheriae gravis*. The description of the special medium for differentiating the strains reached New Zealand too late for its adoption in this series. All the strains were tested for virulence on guinea-pigs, by the intracutaneous method, with positive results.

Finding that patients affected by the grave "bull-neck" type of the disease did not improve after intramuscular injections of 40,000–60,000 units, we supplemented the intramuscular dose by larger doses given intravenously. In each case we endeavoured to estimate the amount required to cure. This we give all at once, avoiding repeated dosage. Occasionally we gave as much as 200,000 units as an initial dose, 50,000–80,000 units intramuscularly and 120,000–150,000 units intravenously. If this was ineffective within twenty-four to thirty-six hours more serum was given. We believe that the injection of these large doses, twice or even thrice repeated, succeeded where less vigorous treatment would have failed. Intravenous injection is dangerous unless given slowly and skilfully, for the patient is often a small child and may be suffering from severe toxic myocarditis. When properly done it is less disturbing than intramuscular injection, as there is no pain. It has the advantage that glucose may be given at the same time to patients who cannot swallow. The largest dose of concentrated antitoxin that can be given intramuscularly is about 40,000 units with each puncture. The best site is the thigh or buttock. The intravenous dose is limited only by the ability of the poisoned circulation to receive it. Anti-scarlet-fever serum was given in addition to three patients suffering from the grave "bull-neck" disease, but with no obvious effect.

Of the eighty-two patients who recovered eight received 100,000 or more units each. In two cases initial doses of 100,000 units on the first day of the disease and 150,000 units on the third day were given; the remaining six had been ill for more than three days before receiving antitoxin. The largest amount used in any case was 648,000 units, which was given to a girl who had been ill for seven days. On the seventh day 50,000 units were given intramuscularly and 250,000 units intravenously. On the ninth day 200,000 and on the tenth day 148,000 units were given intravenously. The patient showed signs of severe myocarditis, the pulse rate was 130–140 for five days, the apex beat moved outwards beyond the anterior axillary line, gallop rhythm was present, the liver was enlarged and tender, and jaundice and albuminuria were present. Recovery was complete.

Brachial Paralysis following Serum

Roger, Mattei, and Paillas (1931) have collected seventy cases of brachial paralysis following serum treatment. Forty followed injection of tetanus antitoxin and only nine injection of diphtheria antitoxin. Allen (1931) has reviewed forty-two reported instances of the neurological complications of serum treatment. Twenty-six followed the use of anti-tetanic serum, whereas four each followed the use of anti-diphtheritic and of anti-streptococcal, and three each the use of anti-pneumococcal and of anti-scarlet-fever serum. Allen divides the cases of paralysis into four groups: radicular, neuritic, polyneuritic, and central.

In one of our patients, a boy of 16 years, treated with 600,000 units of antitoxin, brachial paralysis occurred. On the third day of his illness the fauces were widely covered with membrane, the neck, fauces, and palate were swollen and oedematous, the cervical glands enlarged and tender, and an offensive sanious discharge issued from the nostrils. There were superficial wounds and ulcers on the knees and hands, from which diphtheria bacilli were grown. Eighty thousand units of antitoxin were given intramuscularly and 100,000 units intravenously. On the fifth and sixth days 220,000 and 200,000 units were given respectively. Signs of myocarditis were evident. During the sixth and seventh weeks weakness of the legs and of the external rectus muscle of the left eye, and paralysis of accommodation in both eyes and of the palate, appeared. Weakness of the right upper arm and shoulder-girdle was present, seriously limiting abduction of the right arm. All tendon reflexes were absent, but no loss of sensation or muscular wasting could be detected. Six months later recovery was complete. In this patient there is no obvious reason why the paresis of the upper arm should not have been due to diphtheritic neuritis occurring in an unusual situation. It is not apparent why brachial paralysis following the use of diphtheria antitoxin should be ascribed to the serum rather than to the disease.

Severity of the Disease

As an example of the malignant and fulminating nature of the disease in some instances, we cite the case of a child aged 3½ years, who had been treated two months previously for mild uncomplicated whooping-cough. One morning she complained of sore throat, and was removed immediately to hospital. The temperature was 104° F., pulse 120, and respirations 25; tonsils were swollen and congested, and cervical glands enlarged and tender; no exudate could be seen. Ten thousand units of antitoxin were given intramuscularly. Thirty-six hours later the temperature was 104° F., pulse 156, and respirations 32; the glands were more swollen, there was oedema of the neck, fauces, and uvula, and a patch of exudate less than a threepenny piece on one tonsil. She was restless and looked toxic. Sixty thousand units were given intramuscularly and 140,000 intravenously. She died seven hours later, despite the use of 210,000 units of antitoxin within thirty-six hours of the first appearance of symptoms. Post-mortem examination did not reveal any diphtheritic membrane; there was great oedema of the fauces, glottis, and tissues surrounding the trachea; the lungs were slightly congested; the oesophagus and stomach were normal; the heart muscle was pale, soft, and showed great cloudy swelling, as did also the liver and kidneys. Antitoxin from the supply used in the treatment of this child proved potent to protect guinea-pigs from the virulent diphtheria isolated from her throat.

Of the seven patients who died, two suffered from laryngeal obstruction and were subjected to tracheotomy. One of these died from asphyxia, the other from myocardial failure. Necropsy was done on six of the seven patients who died, and the usual lesions were found. Cloudy swelling of the myocardium, kidneys, and liver were present in all. Two hearts gave striking examples of focal necrosis with areas of small round-celled infiltration scattered through the muscle. A large firmly adherent ante-mortem thrombus was found near the apex of the left ventricle in one case.

Conclusions

The increased case mortality in the Dunedin Hospital during the last three years coincides with the appearance of an exceptionally malignant type of disease.

This type of diphtheria is so little influenced by the usual doses of antitoxin that it is futile to give them.

We believe that the lives of some patients, in desperate straits, have been saved by giving half a million or more units.

We wish to thank Professor D. W. Carmalt-Jones and Professor Frank Fitchett for allowing us access to the patients who were under their care.

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AN UNUSUAL NEISSERIA IN A CASE OF CHRONIC BRONCHITIS*

BY

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In the *British Medical Journal* of February 14th, 1931, Drs. Kirkland and Storer, while describing a case of coryza due to "gonococcal rhinitis," state that "the bacteriological diagnosis is made difficult by the similarity of the *Micrococcus catarrhalis*, which is also Gram-negative and sometimes occurs in pairs, but is never intracellular." This statement,[1] however, is inaccurate, as any of the Neisseria *may* occupy such a position. An example of this is afforded in the present case.

Case Record

A labourer, 58 years old, was seen as an out-patient on January 26th, 1932, complaining of cough with a scanty spit, and steadily increasing muscular weakness, by reason of which he had stopped work. He was well built, well nourished, but of poor muscular tone and posture. The skin was pale and yellowish. Beyond some harshness of breath sounds and slight prolongation of expiration, no abnormal signs were found in the respiratory system. The circulatory, alimentary, nervous, and urinary systems presented no abnormality. The sputum was repeatedly examined for tubercle bacilli, and none were found, but large numbers of

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bean-shaped Gram-negative diplococci, intra- and extracellular, were present. It was considered that they were probably *Neisseria* (*Micrococcus*) *catarrhalis*.

X-ray screen examination showed full diaphragmatic movement, while a film showed increased basal linear striation but no evidence of a parenchymal lesion. The inference was that there was bronchial catarrh. The Wassermann reaction of the blood serum was negative. Examination of the blood gave the following results: red cells 4,200,000 per c.mm.; haemoglobin 72 per cent. (Haldane); there were 8,400 white cells per c.mm., and of these 56 per cent. were polymorphonuclear neutrophils, 11.5 per cent. lymphocytes, 30.5 per cent. large mononuclears, and 2 per cent. eosinophils. A Cooke-Arneth count of the polymorphs resulted thus:

Number of lobes	I	II	III	IV	V
Percentage of cells	16	42	37	5	0
Cooke's[2] average figures	10	25	47	16	2

The Cooke-Arneth count shows a "shift to the left." This, if plurality of lobes be regarded as an index of the age of the cell, is indicative of some preponderance of younger cells, and suggests some active infective process.

Secretion was obtained from the two main bronchi by direct bronchoscopy, kindly done by Dr. Ion Simson Hall, who noted that the respiratory passages presented appearances typical of chronic bronchitis. The bronchial swabs were immediately transferred to the laboratory and put up in culture on Thomson's plasma-agar, laked blood-agar, and blood-smeared agar. Next day there was a pure growth of Gram-negative diplococci in smooth, circular, dull-greyish, raised colonies. These were subcultured (*a*) at 37° C., (*b*) at room temperature. The latter failed to grow despite repeated inoculations. The growth on a forty-eight-hour blood-smeared agar slope was easily emulsifiable in normal saline, forming a homogeneous suspension. Two cubic centimetres of this emulsion were injected intraperitoneally into each of two white mice, and a similar amount was injected into the marginal vein of a rabbit's ear. One mouse died two days after inoculation. Post-mortem examination showed marked dilatation of the veins of the anterior abdominal wall, while the spleen was large, dark, and congested. The peritoneal washings in normal saline were somewhat turbid, and contained only a few Gram-negative diplococci, which grew well on laked blood-agar (or on the same media as before) at 37° C., but repeatedly failed to grow at room temperature. The second mouse died eight days after inoculation, and post-mortem examination revealed a gelatinous form of peritonitis confined mainly to the right iliac fossa. Gram-negative coliform bacilli were obtained from the peritoneal fluid, but the heart blood was sterile. The rabbit appeared to suffer no ill effects, and was still alive eight weeks after the inoculation.

Using Hiss's serum-water medium, the biochemical reactions of the organism were found to be as follows:

Glucose	Lactose	Saccharose	Maltose	Dextrin
Acid	nil	acid	acid	acid

The organism was not agglutinated by the patient's own serum, which gave a negative reaction to the gonococcal complement-fixation test, nor was it agglutinated by meningococcal serums, Types I, II, III, and IV. (This latter, however, does not eliminate an atypical form of meningococcus.) It did not live long in culture, and subcultures had to be made every second day in order to keep the strain alive. Even so, the organism died out after two weeks. Vaccine therapy had been intended, but, in view of the improvement in the patient's condition with hygienic measures and an expectorant mixture, it was not considered to be necessary.

Discussion

This case is interesting in view of the descriptions in recent literature of Gram-negative intracellular diplococci in the nasopharynx. It illustrates the care that must be taken before a definite name can be applied to such organisms. As the organism here described was grown in pure primary culture from both bronchial swabs we can be almost certain that it was responsible for the chronic bronchitis found clinically and radiologically, and confirmed on bronchoscopy. It was obviously not one of the usual members of the *N. catarrhalis* group, as it fermented glucose, maltose, saccharose, and dextrin. Lactose was not fermented, but the colonial appearances were totally different from *N. pharyngis siccus*. The majority of *N. catarrhalis* are auto-agglutinable in saline, whereas this organism formed a homogeneous suspension. The inability to grow at room temperature made one think of *N. meningitidis* and *N. gonorrhoeae*, but the sugar reactions and the faculty of growing easily on blood-smeared agar ruled out the possibility of the organism being a gonococcus. Oliver[3] states that there is a danger of cross-fixation in the gonococcal complement-fixation test with naturally occurring infection with *N. catarrhalis* and aberrant forms of the organism. The test was negative in the case of our patient, so this difficulty did not arise. The fact that there was no agglutination with meningococcal serums does not at once exclude *N. meningitidis*, as in sporadic cases of cerebro-spinal meningitis in non-epidemic periods the causal organism may not be agglutinated by any of the type serums.[4]

The organism described may most correctly be designated a Neisseria of a variety closely related to the meningococcal group.

Summary

There is described a case of chronic bronchitis due to a Neisseria which presented some unusual features. Intracellular Gram-negative diplococci occurring extragenitally should not be labelled gonococci unless a full bacteriological examination has been carried out.

Our thanks are due to Dr. Goodall, physician to the Royal Infirmary, for permission to publish details of this case; and to Dr. W. R. Logan, bacteriologist to the Royal Infirmary, and Dr. Goodall for valuable help and criticism. The animal inoculation experiments were done at the laboratory of the Royal College of Physicians, Edinburgh.

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PREVENTIVE AND CLINICAL MEDICINE IN RELATION TO THE MEDICAL CARE AND TREATMENT OF CHILDREN*

BY

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"The new services of the doctor to the State call for a reconsideration of the whole business of education and equipment. A different kind of doctor is needed in these times. It is clear he must have no less of the learning and skill of former days, while he must also be furnished with an improved training in new subjects, in preventive medicine, and in the political science of communal responsibility."

I do not think I could well find a more suitable introduction to my paper than this quotation from the address given by Sir George Newman when opening the discussion on the future of the practice of medicine, at the Cambridge meeting of the British Medical Association in 1920. There is no question here of the training either for private practice, whether general or specialist practice, or for a public health service, but rather the recognition of the need for a different kind of doctor to meet the demands made by the community to-day and the correspondingly different requirements of medical practice. There will remain, rightly and necessarily, two aspects of medicine, the curative and the preventive, but the appropriate analogy will cease to be the time-honoured one

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of two streams running parallel for some distance after their junction, and will become rather that of a broad stream whose component waters are effectively blended to one common end.

It is to the implications of this new medicine as applied to children that I shall confine myself. Perhaps we hardly realize how far-reaching, carried to its apparently inevitable conclusion, are its implications in regard to medical organization, administration, and education. Every modern textbook on the diseases of children plunges straight into the description of well-recognized disease on the orthodox lines of aetiology, diagnosis, and treatment. A student would find it difficult to cull from such a textbook, whether written from the point of view of the clinician or of the public health service, any satisfactory indication of the modern, but now well-established, trends in the approach made by medicine to the diseases of children. During the first quarter of the present century we have been passing through the stage of clash between the practitioners of clinical and preventive medicine respectively. The task before us, the task primarily of our Association, is the welding of these activities into an organic whole on behalf of the health of the child and its maintenance.

The Incidence of Mortality and Morbidity

In order to provide the necessary data for my argument I will set out briefly some of the more important conditions with which, in children, we have to deal. These may be divided into two broad classes—those tending to lead to death and those tending to disability. There is no necessary correlation between the two classes of ailment. Little or no relation is found between the mortality table for children from birth to 15 years and a second table embodying the findings of medical inspection. The conditions found at medical inspection, if left to develop untreated, will not go to swell the tables of mortality. It is necessary to study both lists if conclusions as to medical organization and practice are to be deduced from the facts, since, though both may lead to similar conclusions, they have each an independent contribution to make to the argument.

The main facts as to mortality are these. Taking the figures for 1931, of every thousand deaths occurring under the age of 15, *respiratory disease* accounted for 241, *epidemic disease* 161, *disease of digestive organs* 90, *tuberculosis of all forms* 56, and *disease of the nervous system* 51. Respiratory disease holds first place easily under 1 year and during the first quinquennium ; it is second only to all epidemic diseases between the ages of 5 and 10. Epidemic disease holds, due chiefly to diphtheria, first place in the second quinquennium ; second place, due to measles and whooping-cough, in the first and also in the third quinquennium ; and third place below the age of 1 year. Tuberculosis ranks first for ages 10 to 15 years and takes third place in the earlier quinquennia. Turning to the findings of medical inspection, the principal diseases in their order of frequency are dental disease, defective vision, enlarged tonsils and adenoids, disease of the skin, malnutrition, diseases of the ear and defective hearing, deformities, heart disease, and disease of the nervous system. These two lists do not, however, complete the tale. They take no direct cognizance, for example, either of such a general condition as debility or of rheumatism. Of the cause or causes of the former we are often largely ignorant, and what constitutes a diagnosis of rheumatism is not infrequently in dispute. Nevertheless, in regard to both of these conditions, accurate diagnosis and proper treatment may be of the first importance.

There is, of course, nothing fresh about these particulars. In regard to the fatal illnesses of childhood, it is common knowledge that our present organization of medical service is not meeting, sufficiently fully, the need for medical and nursing care, especially in the case of the very young child. We are not only behind in the measures adopted for prevention, but even in those available for actual treatment. This applies in particular to the heavy mortality associated with measles and whooping-cough, and with respiratory disease, in the main bronchopneumonia. In so far as the figures disclose disease or defect discovered at school medical inspection, appropriate machinery has been set up by the various local education authorities to secure treatment, and the returns sent in year by year by school medical officers testify, up to a point, to the efficacy of the arrangements made and to the value of the treatment given. But no one who has watched closely the development of the School Medical Service during the past thirty years can pretend to rest content with its achievements, great though the gain has been to the child. The need, in the early days of the service, for the treatment of gross disease and defect was necessarily clamant. This forced attention to prevention, to the treatment of disease in its early stages, in order to prevent its later development. The need is now recognized of going back further still, of obtaining a fuller understanding of health, of its different manifestations in different individuals, and of those early departures from physiological fitness which, uncorrected, lead on to physical signs and symptoms we recognize as pathological. A fresh biological approach to medicine in its theory and its practice is now required.

Illustrative Examples of Clinical Preventive Medicine

The doctor of the past was in his practice relatively self-sufficient: he is becoming more and more the leader of a team. It is the requirement of team work that has tended increasingly to associate clinical medicine with the work of the public health officer. Team work comes naturally to him ; not so to the general practitioner. If disease in children is to be treated in its early beginnings, the treatment to be effective must not be, in many cases, an incident in time with the doctor in the forefront of the picture—as may often be the case in acute disease, or when operative treatment is necessary, as, for example, in appendicitis—but a process in which various individuals and even organizations play a part under the doctor's direction, and into this the specialist or consultant should come equally with the general practitioner. Moreover, in this team work there must be no divorce between diagnosis and treatment, no artificial break at the expense of clinical medicine to suit the convenience of medical administration.

One or two concrete examples will help to show how complicated and difficult a business, compared with the treatment of well-established disease, may be the treatment both of disease in its early stages and of deviations from normal health. They will help to show, if clinical medicine is to function effectively, what indications there appear to be for modifications and developments in current methods of medical administration and practice. As my first example I will take *crippling* among school children. The work that has been done towards the abolition of the crippled child, as we have known him in the past, has been made possible only by the adoption of a concerted plan—an orthopaedic scheme, as it is called —which depends for effective functioning on the working together as one team of the child and the parent, the family practitioner, the school medical officer and the local authority, the specialist surgeon, the orthopaedic hospital and convalescent home, the orthopaedic clinic sister, the health visitor, the infant welfare centre, and the teacher and the school. No single individual is more important in team work of this kind than the general practitioner. Early and correct diagnosis is the first requirement of preventive medicine. At present, however, there are many considerations which may make it difficult for him to follow up his clinical advantage to its full fruition.

Then, secondly, the necessity for team work is being well demonstrated in the case of the *rheumatic* child. This work, however, is still in its infancy. It is based in part on assumption, and is hampered by our still imperfect knowledge as to the nature of rheumatism, as to the early manifestations of disease rightly attributable to it, and as to the treatment of those early conditions from the standpoint of the prevention of further develop-

ment. There are few tasks more difficult in clinical medicine than the right reading and interpretation of the natural history of heart disease. However carefully an individual may have been watched over a period of years, during which the condition may have progressed under our very eyes, we may have been at a loss to evaluate the factors determining the progress. An immense amount of careful recording of the results of physical examination, of the personal, family, and general environmental conditions of the child and adolescent, of the results of treatment—using this term in its broadest sense—will be required, and final data can be obtained only after a long period of time measured by years. Apart from team work, therefore, there is little or no prospect of a successful issue of a campaign to lessen effectively in the young adult the incidence of heart disease as we know it. The pivot in this enterprise should undoubtedly be the family practitioner; but again the present conditions of practice make it difficult often for him to function effectively. A comparatively long history of rheumatic infection may have preceded the first opportunity he has of seeing the child or adolescent, and the opportunity for watching developments, through the earlier stages of what may or may not prove to be rheumatic infection, may indeed fall more readily to the school doctor than to the family practitioner.

Further, this recently developed type of clinical medicine illustrates well the new place and function of the consultant or specialist. He has in the past been associated chiefly with well-established disease, and has been called in to diagnose some obscure condition or to advise as to treatment when life or death seemed at stake. We have not looked upon the consultant as a predominant partner in the great clinical enterprise of the prevention of disease in its early stages, but as an individual acting independently, who is concerned almost entirely with treatment and prognosis of disease which has reached a definite and usually advanced stage. Similarly with the hospital; it is reserved for the treatment of acute and well-established disease, and has rather prided itself on its isolation. There are many reasons for this which there is neither time nor need to discuss here, but a different and additional function awaits the hospital if it is to play its part in this development of team clinical medicine. It is common knowledge how urgent is the need for hospital reorganization and differentiation, even from the point of view of the effective fulfilment of its present functions in the treatment of disease. If the hospital is to become a partner in the team of preventive clinicians, accommodation will be required for the more accurate observation of disease in its earlier manifestations, and special facilities for the carrying out of investigations into the different branches of clinical pathology; there will need to be also the closest co-operation with other members of the team. Records made and kept will be on agreed lines, and those of each member made available to others. Work of this character over a long period may well be expected to bring the greatest benefit to the individual child, but this type of record is necessarily also of the nature of research work, towards which the often disjointed work of to-day can make but little contribution. Though reference has been made to these points in connexion with the steps taken for the prevention of heart disease they have also a much wider application. Rheumatism, however, forms a particularly appropriate illustration, since "rheumatic schemes," working on these principles, are actually operating, a notable instance being the scheme of Bristol and adjacent county areas.

Defective vision in children and the work of the oculist may be taken as a third illustration of how the idea of preventive clinical medicine may be extended to branches of specialist medicine. The oculist presents us with the last word in the treatment of disease and defect, but it is difficult to believe that defective eyesight in children has not more to gain than in the past from the application of these preventive principles in clinical medicine.

I take a final illustration from the very different sphere of mental health, and would instance the case of the *delinquent child*. He is in a less favourable position than the child suffering from some well-marked form of physical disease. Our machinery for diagnosis and treatment in the case of physical disease is reasonably satisfactory, but this cannot be claimed in the case of the delinquent child. Although we occasionally recognize disease as among the direct causes of delinquency, notably in the case of encephalitis lethargica, nevertheless we associate with the delinquent child punishment rather than treatment. The study of delinquency as a symptom of mental ill-health has not yet progressed far. We have not up to the present made a concerted scientific effort towards prevention; we know comparatively little about the significance of early stages of departure from sound mental health. One thing, however, can be said—namely, that without well-planned team work there can be no hope of elucidating the problems of causation and treatment. The main problem is that of understanding and evaluating the significance of manifestations of behaviour in relation to the age of the child and to its family, school, and social environment. To this end the psychiatrist, the psychologist, the trained social worker, and the school teacher will each have their part to play.

Suggested Medical Reorganization

Now this growing view of medicine, of clinical medicine, as an enterprise concerned primarily with the understanding of health and its maintenance, and the early detection and treatment of departure from the normal, cannot but have a profound influence upon the organization of our health services for children. At present the activities of clinical and preventive medicine run parallel, each fairly well defined. On the whole we may claim, as in the case of Elia and his cousin Bridget, that

> "we house together . . . in a sort of double singleness" and "are generally in harmony, with occasional bickerings—as it should be among near relations."

We work on the theory that the school doctor is there to detect disease and defect, and, this done, to hand over the child to the family practitioner for treatment. This process may seem sufficiently reasonable in the case of disease or defect well developed, or of such a nature as to require little other than well-defined medical treatment at the hands of the practitioner.

Most conditions in childhood, however, either require following up and treatment in regard to which the doctor plays the part of supervisor rather than of actual agent, or are of a character requiring reference to a specialist rather than to a general practitioner. We can be said to have arrived at a sort of working compromise, as a result of which some conditions are treated under the aegis of the school medical service direct and some are referred to the family practitioner. I think it may be said generally that peace reigns between the practitioner and the school doctor. Nevertheless it is a peace which in some measure fails to bring satisfaction, and some of us may feel that it is a peace bought at the expense of clinical medicine. We can hardly rest satisfied with any system which divorces diagnosis and treatment if what we are primarily concerned with is the maintenance of health and the detection and treatment of early deviations from health. Clinical medicine is one and indivisible, and unity must be preserved. This is not the occasion to develop this principle and its application in detail, but it leaves no place for reference of a child out of one system and into another and perhaps back again into the first. We confine to one party the duty of medical inspection at school and to the other the task of domiciliary visits. It is impossible to build a sound clinical edifice on such an arbitrary division of labour. It is to cut the thread that should run through the medical life history of the child.

In thus formulating the claims of clinical preventive medicine I do not think I have overstated them, and I do not pretend that any satisfactory solution is at present in sight. The scheme of the British Medical Association, drawn up with so much insight into present-day needs, seems to me unsatisfactory at this point; it meets the difficulty and passes on. It assumes that medical inspection will go on as heretofore, and that the school doctor will play little part as a clinician other than that

of discovering disease and defect and then ejecting the child. This seems to misinterpret the place and function of clinical medicine. Is there no alternative? Is there no hope of substituting a single-doctor for a dual-doctor system? Such a unified system would involve considerable give and take on the part of the public health and the general practitioner service respectively. In practice, so deep are the furrows in which we now work, it might well be found that a change in the direction indicated might result in loss out of proportion to the gain, and we should on balance be left in no better position than at present. But I believe, nevertheless, that the possibilities of the change should be carefully explored. Bound up in the proposal are three main requirements, involving, first, the panel family instead of merely the panel industrial worker, thus eliminating the present method of payment by "medical act," as Sir Arthur Newsholme calls it; secondly, the willingness of the family practitioner, acting in this capacity as a member of the public health staff and in a manner similar to that of the present assistant school medical officer, to supply to the medical officer of the local authority reports in such form and at such intervals as may be prescribed; thirdly, a reconsideration of the medical education of the practitioner on the general lines indicated in the quotation at the head of this paper. Perhaps this latter may prove to be the most radical change of all, for there is involved the study of health as well as that of disease, and the assurance of a biological rather than a pathological approach to medicine for all who would practise the art in whatever direction or capacity.

The advantages of an organization on the lines indicated are obvious, but it will be agreed that organization alone will not produce the desired end. A high standard of skill and ideals must inform the whole service before there can be assured a real unity of medical supervision throughout the life of the child from infancy upwards. The framework would be that of the public health service, the general arrangements being in the charge of the medical organizer of the local public health service. There would be an important readjustment of the outlook and work of the general practitioner. He would no longer be consulted only when the child was considered by the parent sufficiently ill to seek his advice, and then, on the ground of expense, as sparingly as possible. He would so adjust the conduct of his practice that it grew in conformity with a health rather than a disease service. He would have at his command a health visiting and nursing service, equipped and maintained by the local authority, and specialist, hospital, and convalescent home service, arranged as part of the public health framework. Within the framework of such a Community Medical Service would be afforded to the practitioner the fullest freedom for medical practice; a practice in which the bond between doctor and family would form the strongest link in the chain.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

EMBOLISM OF THE CENTRAL RETINAL ARTERY

In view of the rarity of success in these cases, I think this one is worth recording, especially as the patient has asked me to do so.

The widow, aged 70, of a former colleague and friend consulted me on New Year's Day, 1929, with advanced senile cataract in both eyes. The left one reached maturity in July, 1930, when I extracted the cataract with quite satisfactory results (corrected V = 6/9 ptl.). The patient enjoyed good vision till October 8th, when, after supper, a 'phone call summoned me, because she had gone totally blind. I found that at tea-time, while quietly seated at table, vision had suddenly been snuffed out. Examination revealed the picture of embolism of the central retinal artery, with cherry-coloured spot at the macula. (The patient has an "organic heart.") I held out little hope for her left eye, and gave it as my opinion that we would probably, or almost certainly, have to resort to extraction of the right cataract, which is now mature, if we hoped to restore vision. In all cases, however, I always give treatment a fair trial.

I therefore ordered 2 per cent. pilocarpine to be instilled, and repeated in ten minutes, this to be followed forty minutes after the first drop by vigorous massage for five minutes. This was carried out at once by Dr. Ewing, and repeated three times the next day, without result. I advised that it be kept up for at least three days. After the morning massage on October 10th Dr. Ewing called me up on the 'phone to tell me that vision had returned. I advised perseverance with the treatment, for safety, till I saw the patient on October 12th. All the retinal arteries are now in full action again, and well filled, and her vision is as good as ever. A recurrence is, I think, most unlikely, and embolism in both eyes very rarely happens.

Here I can only quote one other case where I succeeded in dislodging an embolus which was visible in a branch of the retinal artery. It occurred in a soldier whom I was asked to see, who had septic endocarditis (Schottmüller's endocarditis lenta). His vision and partial loss of field were restored, and, I believe, remained up to his death, which was, of course, inevitable. Two further cases I have in mind, and hope to trace and report shortly.

There is therefore some chance in these cases, and it seems reasonable to assume that the sooner massage is begun the better.

GEORGE YOUNG, M.D.

Colchester.

A CASE OF COMPLETE SECTION OF BOTH SCIATIC NERVES

The following case, in which attempts to suture the cut ends of both sciatic nerves failed entirely and were followed by recovery, with satisfactory restoration of function, seems of sufficient interest to be worthy of record.

CASE HISTORY

J. B., a schoolboy aged 8, fell twenty feet through a glass roof on June 23rd, 1927, and was admitted to my wards in the Royal Infirmary in an absolutely collapsed and pulseless condition, having lost much blood from two deep lacerated wounds, one at the back of each thigh. The muscles had been divided, and were protruding from the wounds, and both sciatic nerves had been completely severed.

Next morning, notwithstanding all treatment, the patient's condition was very critical, the pulse being just perceptible, and very rapid and weak. As the day advanced his condition became even worse, and a transfusion of blood was accordingly given, his mother being the donor. Thereafter he improved somewhat, and on the 29th an attempt was made to suture the left sciatic nerve and the muscles. Six days later the right nerve was sutured, and, as the left had sloughed, it was again sutured. The patient now became extremely ill once more. Both wounds became extremely dirty, both nerves sloughed, and it was recognized that attention must be directed entirely towards trying to save the boy's life, the legs being allowed to take their chance. No further effort was therefore made to unite the nerves, operations on which had failed. As the patient grew stronger, however, the wounds began to clean up and to granulate. The lower limbs, contrary to expectation, maintained a fairly normal appearance, and as the general condition improved sensation was found to be fair, although dulled, especially on the extensor aspects. Foot-drop was troublesome, particularly on the right side, and the knees tended constantly to become flexed. Gentle extension was applied to correct the flexion, and treatment by massage and electricity was commenced. About this time the patient began to be able to move the limbs, and he was encouraged to do this constantly and always more freely.

By October the wounds were greatly improved, but still required daily dressing. Light plaster casings were applied

to the limbs, and he began to walk with the aid of a go-cart, until in November, five months after the injury, he was able to walk with crutches, and was sent to a convalescent home. On his return to the hospital in December he was able to walk without crutches. About this time the wounds healed completely, and they gave no further trouble, although plasters had to be kept on the limbs to prevent flexion at the knee-joints. Thereafter, the patient had little trouble until the following winter, when he developed trophic sores on both great toes, and later on both little toes and the right middle toe. The toes became swollen and blue, but were not cold or painful. Sensation was defective, however, particularly in the terminal phalanges, which ulcerated. Attention to the general health and to the boots, with regular dressing, effected a cure. Similar trophic sores developed in each succeeding winter in spite of all possible care. The patient had scarlet fever in 1929, and a severe attack of influenza in 1931, which put a stop to treatment by massage and electricity, which had been carried out fairly regularly until then. Now, in September, 1932, save for the healed scars at the back of the thighs, rather thin legs, and some deformity of the toes, which are anaesthetic, and which he cannot move, the patient's lower limbs are practically normal. He can walk a couple of miles, can run, jump, ride a bicycle, and play football. He is seldom out of mischief, but is annoyed to find that he cannot yet outrun the police when they are in hot pursuit.

Sensation and Electrical Reactions

As regards sensation, Mr. R. Ninian, my acting house-surgeon, reports as follows:

There is absence of touch-sense over an area extending from the middle of the metatarsals distally. This area is rather larger on the right side than on the left. Sensation of pain is likewise absent over this area. Discrimination between two touching points close together is defective all over both lower limbs below the knee. Perception of heat is defective over the lower half of the outer side of the right leg, and over the right dorsum and sole, while on the left side it is defective over the dorsum and sole.

Below is a report on his electrical reactions, dated July 9th, 1932, and kindly prepared for me by Dr. A. B. MacLean, director of the electrical department, where much of the later treatment was carried out. The weak or absent response to faradism of many groups of muscles, together with the strong response to galvanism, will be noted.

All muscles of both thighs respond to faradism.

Left Leg:

Anterior tibial group: No response to faradism; strong response to galvanism.
Posterior tibial group:
Superficial: Weak response to faradism.
Deep: No response to faradism; strong response to galvanism.
Foot: No response to faradism; strong response to galvanism.

Right Leg:

Anterior tibial group: No response to faradism; strong response to galvanism.
Posterior tibial group:
Superficial: Normal response to faradism.
Deep: No response to faradism; strong response to galvanism.
Foot: No response to faradism; strong response to galvanism.

The early attempts to join the divided ends of the sciatic nerves were made in the belief that only by securing an early and successful union could the lower limbs be saved. These attempts quite definitely failed, and yet the limbs have made a remarkably good recovery. It would be interesting to have the views of neurologists on what has occurred in this case. Have other nerves taken up the functions of the divided sciatics, and, if so, why are there defects in sensation and in electrical reactions? or have the nerves, once they were left alone, and the wounds had cleaned, sent out new shoots, which somehow found their way from, say, the motor tract in the proximal portion to the corresponding tract in the distal? This suggestion likewise would not appear to explain the motor and sensory paralysis of the toes and a portion of the foot.

J. Macewen, M.B., C.M.
Surgeon, Glasgow Royal Infirmary.

Reports of Societies

THE TONSIL PROBLEM

The annual Semon Lecture was delivered at the Royal Society of Medicine on November 3rd by Professor Otto Kahler, director of the Freiburg University Oto-rhino-laryngology Clinic, who took for his subject "The tonsil problem."

Professor Kahler devoted himself to two questions—namely, the physiological role of the tonsils, and the so-called chronic tonsillitis. During the last fifty years the popular view on tonsillectomy had changed several times. In the 'nineties, when the theory of infection came into vogue, the tonsils were thought to be a channel for invasion by various micro-organisms, and it was then fashionable to have the tonsils removed. Later, the tonsils were considered to be protective organs, and there was a tendency against a too radical procedure. With the theory of the chronic infection of the tonsillar crypts tonsillectomy again returned to favour, but afterwards warnings were heard against this operation on account of the alleged physiological importance of the tonsils. No theory as to the function of the tonsils had yet been established. They belonged to that group of lymphatics described as the subepithelial lymphatic tissue. The researches by Schlemmer had shown that the tonsils were an integral part of the whole nasopharyngeal mucous membrane. By means of injections Schlemmer had proved that neither the tonsils nor the other lymphatic pharyngeal tissue possessed afferent lymphatic vessels. The lymphatic capillary network of the tonsils represented a canal system, and the flow of the lymph stream was exclusively centripetal. Schlemmer's work thus refuted the lymphatic gland theory, and also the defence theory of Brieger, who had assumed that a lymph stream flowing through the tonsils prevented the invasion of micro-organisms. Another theory which had adherents was based on the recent researches into the so-called germ centres, which were regarded as centres of reaction against bacteria and toxins penetrating into the lymphoid tissue. For his own part Professor Kahler shared Aschoff's view that the germ centres might be considered as centres of reaction against invading toxins, but that this fact did not prevent them from producing lymphocytes in case of need. If the new view of the role of the germ centres was acknowledged, the tonsils could be regarded as having a certain protective function, which was common to the whole lymphatic apparatus so far as it contained germ centres. The theory that the tonsils were possibly endocrine glands had been refuted in the lecturer's own clinic. The fact that injection of tonsillar extract diminished the blood pressure did not necessarily mean that hormones were produced in the tonsils. Workers in his clinic had succeeded in chemically preparing from the tonsils a substance—acetylcholine—which lowered blood pressure. Voss, having observed that children often thrived after removal of the tonsils, fed tadpoles with tonsillar substance, and found that they grew at a slower rate than controls. Hence Voss concluded that the tonsils caused a certain arrest of development. On the other hand, Slobotink had fed mice and rats with tonsils, and had observed an acceleration of development. But even if the theory of the tonsils arresting development held good, the researches of Voss seemed to him to be of no evidential value, because the arrest of development might be explained as caused by the toxins and bacteria in the tonsils. Up to now it had not been possible to prove that the tonsillar tissue effected internal secretion, though simply to dismiss this theory was likewise impossible. In truth very little was known about the function of the tonsil, but the fact that it formed but a very small part of the lymphadenoid tissue of the oral cavity and of the pharynx, and that by tonsillectomy only an insignificant part of the mucous membrane was removed, made it probable that complete removal could do no harm; this was sufficiently confirmed by clinical experience.

While Paesler's theory that more than forty-five different diseases could be traced to focal infection of the

tonsils went too far, it was generally recognized nowadays that rheumatic diseases and other infections were connected with these organs. It was strange that the theory of chronic tonsillitis had maintained itself for such a long time without any closer pathological-anatomical researches being made. The first to point out that the clinical theory of chronic tonsillitis had not yet been cleared up was the Viennese laryngologist Fein, whose work stimulated a good deal of other research into this subject. It was no longer doubtful that infections might start from the surface of the tonsils. In acute tonsillitis, as in appendicitis, there was a primary infection—a more or less considerable defect in the epithelium, from which the bacteria started to attack the tonsillar tissue. Dietrich had thoroughly investigated this problem, and had stated expressly that it was often difficult to lay it down that the disease of a tonsil was chronic. Before Dietrich's research work was published the lecturer had already occupied himself with the histology of chronic tonsillitis, and had been specially interested in the question whether, in the tonsils of patients sent for operation on account of the supposed connexion between the tonsils and the general infections from which they were suffering, there could be obtained any findings justifying tonsillectomy. He regularly found—though, it was true, in many cases only after a great deal of searching—focal disease in the tonsil, leucocytic infiltration of the tonsillar tissue—especially a very dense infiltration of the cryptal epithelium—and in the crypts plugs that consisted only of leucocytes and a great many bacteria. It would probably be asked whether such infiltration of leucocytes did not occur in the normal case. No doubt it was difficult to judge of diseased tonsils, because only in a very few cases was a really normal tonsil seen. But in the tonsils of newborn children there were almost no leucocytes, nor were these to be found in hypertrophic tonsils that were removed on account of their size. Further researches fully confirmed and completed Dietrich's findings, and it was ascertained that there were special points of predilection for the chronic foci of inflammation. It had long been known that infections often started from the tonsillar fossa, but Ruf was the first to point out the frequency of disease in the other recesses.

The practitioner, Professor Kahler continued, was not so much interested in the histological findings as in the question how to discern clinically chronic tonsillitis. The enlargement of the tonsils was no sure symptom of this condition, for constitutional changes very often led to tonsillar hypertrophy. Such hypertrophy might also be caused by inflammation, but he thought that the role of inflammation was secondary. Nor must the diagnosis of chronic tonsillitis be based on the clefts of the tonsils. The development of the tonsil itself formed the clefts. There was more possibility of drawing conclusions as to tonsillar disease from the nature of the contents of the crypts and the recesses, but even this did not allow of a certain diagnosis. Moreover, in the very important inflammatory processes, the deep-seated closed crypts would escape notice on clinical observation. The outstanding fact remained that there were general infections which cleared up after removal of the tonsils. Tonsillectomy could do no harm. In spite of all attempts to prove the contrary, this fact had been confirmed by clinical experience. It was an error to suppose that patients who had had their tonsils removed suffered more often from colds or infections. It was true that such illnesses could not be entirely prevented by tonsillectomy, for they were diseases of the mucous membrane, and were due often to its constitutional inferiority. The apparently greater frequency of colds, of which some patients complained, after tonsillectomy had been performed was due to the fact that the diseases of the mucous membrane were then likely to receive more attention, whereas before the operation the grave symptoms of the tonsillar disease overlaid all other considerations. At the same time, Professor Kahler declared that he was not in favour of indiscriminate tonsillectomy. The first duty was a thorough examination of all the indications. If, however, he began to treat the tonsillitis, he saw tonsillectomy as the only treatment to be adopted. There had been some opinion in favour of the so-called conservative treatment of chronic tonsillitis, such as the removal of the upper pole, or tonsillotomy, but all these methods, in his view, were dangerous. Nor was *x*-ray treatment able to take the place of tonsillectomy, for such treatment caused the adenoid tissue to shrink, but it did not destroy the crypts, with their infectious contents.

TREATMENT OF ACUTE APPENDICITIS

A joint discussion of the Sections of Medicine and Surgery of the Royal Society of Medicine was held on November 2nd, with Mr. HUGH LETT, president of the Section of Surgery, in the chair, the subject being "The treatment of acute appendicitis."

Dr. J. A. RYLE said that the discussion owed its origin to the address delivered by Sir James Berry to the Medical Society of London, entitled "Fallen idols," in May last.[1] Sir James Berry made a somewhat dogmatic pronouncement in favour of conservative measures, with a suggestion that judgement had been lagging behind technique in modern surgery. The problem of treatment in appendicitis was really a complex problem in judgement, not to be solved by statistics or opinion, but only by a pooling of experience and careful analysis of clinical records and of the factors contributing to success or failure. In the case of appendicitis a bare diagnosis was not enough; a visualization of the type and stage of the pathological process was of the utmost importance in determining procedure. He held that there was no real antagonism between the medical mind representing conservatism and the surgical mind representing radicalism. It might be justly claimed that there was at least as often a medical side to acute abdominal disease as there was a surgical side to chronic abdominal disease. The physician of to-day saw far fewer cases of acute appendicitis than the surgeon, but the cases to which he was summoned belonged to the "problem" class of cases developing complications consequent upon the disease or the operation. In a series of some thirty private consultations on cases of appendicitis he found that in rather more than half he had been called in for a decision as to when to operate, and in rather less than half he had been called in on account of complications following the operation. Delay in diagnosis was still the outstanding cause of mortality. He produced the figures relating to acute appendicitis at Guy's Hospital for 1931. There had been 196 admissions; 189 of these came to operation, and there had been three deaths, one from lobar pneumonia three weeks after an uncomplicated appendicectomy, and two following operations for gangrenous appendix. It was clear that operation in itself was not in this series an appreciable cause of mortality. The most dangerous type of appendicitis, and the type most easily and frequently missed, was Wilkie's obstructive type, and here operation should never be delayed. In the inflammatory type medical treatment and an "interval" operation might be justified if the symptoms were slight and recurrent, or in the "acute" case seen in a stage of subsidence. Operation might reasonably be delayed if a localized abscess was forming. The most difficult decisions were in the cases seen late with ileus or symptoms of intestinal obstruction; here collaboration between physician and surgeon might be of special value. Of the general practitioner it might well be asked that he should acquire a better knowledge of appendicular pathology and the corresponding symtomatology, and be able to recognize Wilkie's obstructive type in its earliest stage. The first duty in every case of acute appendicitis was not to operate quickly at all costs, but to assess and plan the optimum moment for operation.

Mr. H. H. RAYNER said that, on the evidence of the Registrar-General's returns, which showed a steady mortality rate during the last twenty years—seventy to seventy-four deaths per million persons living—it was often asserted that surgery was making no progress in this disease. Was this assumption justified without information, which was unobtainable, about the disease

[1] *British Medical Journal*, May 14th, 1932, p. 904.

incidence? Reliable statistics from the large hospitals showed that the case mortality had been more than halved during the last twenty years. At St. Thomas's, on comparing a ten-year period ending 1903 with a ten-year period ending 1929, it appeared that the cases submitted to operation in the acute stage had increased four-fold, and the number of deaths had been reduced by one-half. During this same period the number of early operations—those performed during the first twenty-four hours—had increased substantially. In a series of eighty personal cases, operated upon within twenty-four hours, the speaker had had no death, yet among these there were many cases which had perforated and produced spreading peritonitis. The terms "early" and "unperforated" appendix were not synonymous. He knew that many general practitioners were staunch supporters of early operation. Contraindications to operation were senility, marked cardiovascular degenerative changes, excessive stoutness, and a serious degree of chronic bronchitis. If no experienced operating surgeon was at hand, as perhaps on board ship or in a remote district, the surgeon in charge should take stock of his own experience and of the adequacy of the assistance he could command, and should remember that the disease, if left to run its course, had a natural mortality of 14 or 15 per cent., not 90 or 100 per cent., like some other acute abdominal diseases. Operation on the second day, irrespective of perforation, was also to be advocated, although the risk of mortality would have risen by 5 per cent. as compared with the first day. On the third day, and afterwards, the disease would be established, with evidence of pathological type and some ground on which to make a prognosis. About 50 per cent. of cases of the localized type would settle down. If diffuse peritonitis were present, or if there was local peritonitis with extreme tenderness over the area, or signs of severe toxaemia, one should operate at once whatever the duration. Mr. Rayner added a word about the anaesthetic. He believed that ether anaesthesia added a further toxic element which was not sufficiently appreciated, but was enough to turn the scales against the patient in a severe case of appendicular peritonitis. In severe types, and in abscess with obvious toxaemia, spinal anaesthesia should be employed, or, failing this, gas and oxygen.

Dr. H. Morley Fletcher remarked that statistics were difficult to interpret. He quite believed that the statistics of the great hospitals in London and the provinces would show a remarkable reduction in mortality, but at the same time the Registrar-General's reports furnished a different picture. He could not help thinking that in the country, not necessarily in the great hospitals, a large number of operations took place presumably for appendicitis when the appendix was not responsible. Twice within three months he had seen cases in which the appendix had been removed in typhoid fever. One point should be emphasized: that in children, without exception, immediate operation should be resorted to. The risk in leaving children unoperated was very great.

Mr. R. Davies-Colley said that, on reading some of the most recent textbooks, he was left with the impression that in the middle or dangerous stage the right thing to do as a routine was to wait and watch the development of the case, and only to operate if there were signs that it was going wrong. Even later on, when abscess formation was occurring, one got the impression from these same sources that it was better for the abscess to burst into the rectum before the knife was applied. If these principles were followed in detail he could not help thinking that it would be putting back the clock twenty years. He himself was absolutely opposed to delay in operation in that middle stage, save in certain quite exceptional cases. He would limit the cases for delayed treatment to those which were obviously clearing up, or to patients who for some other reason were unsuited for operation. He was not at all convinced that the high mortality in appendicitis was the result of a bad choice of time for operation; it was much more likely to be due to bad technique. He did not believe that there was the great risk which was made out in some quarters in operating on the early spreading cases of peritonitis.

Dr. Leonard Findlay said that his experience had been mainly with children, and there he agreed with Dr. Morley Fletcher that as soon as the diagnosis was made the operation should be undertaken. He could remember a time when cases of appendicitis were treated in the medical wards. First, the principle followed was to wait until the third day; later on, the recognized plan was to wait until the second day, and, at last, the procedure followed was not to wait at all; and certainly, so far as children were concerned, he had never seen occasion to regret that rule. If he had any criticism to make of his surgical colleagues it was that, especially with children, they did not ask the physician sufficiently often to help them in making a diagnosis.

Mr. John Morley said that it was not sufficiently realized among the profession generally that if a case was seen during the very early hours of an attack, when the patient complained of a diffuse colicky pain across the upper abdomen, the localized tenderness and rigidity upon which reliance must be placed for a definite diagnosis of acute appendicitis was very often entirely absent, and physical examination revealed nothing. It was a pity that that was not generally known, particularly by the general practitioner, who saw the case first. They all recognized the occasional occurrence of the very severe fulminating peritonitis which Wilkie had described as resulting from acute appendicular obstruction. There were, however, certain points on which Wilkie's teaching was open to criticism. Wilkie seemed to suggest that it was possible by clinical examination to divide the early cases into two classes: the commoner inflammatory type which might safely be allowed to settle, and the rarer obstructive type, which was fatal if operation did not take place promptly. The speaker believed that a clear majority of all cases of acute appendicitis were obstructive, but there was a great variation among these obstructive cases in the speed with which tension gangrene and perforation occurred. Not all cases of acute appendicular obstruction perforated early, and when they did perforate they did not necessarily give rise to anything more than a localized abscess. Further, he did not think there was any sure criterion before perforation had occurred as to which of the obstructive cases were likely to be fulminating in their course and which were likely to be relatively benign. The commonest cause of obstruction was a faecal concretion in the appendix, and he thought that the severity of the result of perforation from such an obstruction depended very much upon the position in the appendix in which the perforation took place, whilst the position of the appendix itself was also important.

Mr. A. J. Walton said that in his belief there were three quite distinct types of appendicitis: the one on which Wilkie had laid so much stress, another in which the infection started off as a generalized colitis and then limited itself to the appendix, and a third in which the infection was blood-borne; but one could not definitely say clinically with which of these types one was dealing. Therefore he did not believe that it would serve any purpose to say that an appendix was of one type or the other, and that the one should be operated upon and the other left. He pleaded for operation in all cases. Speaking more particularly of cases in which there was a localized abscess, he asked those present to think for a moment what happened if such cases were left. He had been brought up with a surgeon, now dead, who always watched such cases; there was a high mortality among those that were watched. What was not mentioned, however, was the high mortality also of the "interval" operation, when the operation was carried out three, four, or five weeks afterwards, and a dense mass of adhesions was found. A much higher mortality would be obtained by leaving these abscesses than by operating on them at once. The one exception he would make to his rule to operate in all cases was the very stout patient. A very stout patient who had any acute infection was a great operative risk. But, allowing for that single exception, he still held that if one wanted to do the greatest amount of good to the greatest number of cases there was only one rule to follow—namely, immediate operation.

Mr. HERBERT BROWN said that he had been for a great many years much interested in appendicitis, and had been impressed with the risk that sometimes occurred in operating in the middle of the first week on what appeared to be a simple appendicular abscess. It looked to him as though, by swabbing the cavity, one dislodged a protective layer of lymph, and that some virulent organisms thus became absorbed in the circulation, with the result that the patient sometimes died from an acute septicaemia. Since he had been impressed by this result he had followed the plan of not manipulating the abscess cavity, or simply putting in a drainage tube. In the alternative, he waited until the end of the first week, by which time immunity might be expected to have been established. He was strongly convinced of the desirability of operation within twenty-four hours whenever possible, but with these cases of abscess it might be wiser to wait until the end of the first week for the establishment of some degree of general immunity.

Mr. J. B. HUNTER supported Mr. Walton's reasoned argument in favour of immediate operation. At University College Hospital, where immediate operation was the routine, he got out statistics some time ago for a five-year period, and found that the mortality was about 3.5 per cent. That figure related to immediate operations for all cases of appendicitis irrespective of date. He stressed the urgent necessity of operating in children.

Mr. ZACHARY COPE said that there were some cases in which extended experience made one feel that it was better to wait before operating. One class of case in which some delay was advisable was a very extended general peritonitis. If the patient were given saline per rectum to improve the general condition the operation might be performed successfully in a day or two, though it would have been fatal had it been performed off-hand. A case of ileus with a rapid pulse should be treated expectantly before being precipitated into the difficulties and dangers of operation. To say that immediate operation should always be undertaken was not to give the clinician any credit for judgement.

The CHAIRMAN (Mr. Lett), in closing the discussion, referred to the improvements in the technique of treatment during modern times. He remembered that it used to be the practice, with an abdominal operation of any sort, to place the patient in the Trendelenburg position. In the old days, too, saline treatment was unknown, and when it did come in it was practised so assiduously that some of the patients died. Early operation was undoubtedly responsible for a tremendous drop in mortality. Emphasis had been laid upon the importance of clinical judgement, but he could not help thinking that if the view were broadcast that there should be delay in these cases the result up and down the country would be that many cases which should have been operated on immediately would be subject to delay, which might often be fatal.

Dr. RYLE, in reply, considered that if Mr. Walton's dictum that immediate operation should take place in all cases, with the single exception of the fat patient, were published far and wide it would be just as dangerous as the remarks of Sir James Berry. In Mr. Walton's hands such a procedure would be perfectly sound, but proficiency and skill in surgical technique throughout the country were not uniform. Mr. RAYNER, also in reply, said that they ought not to be stampeded into an unnecessary or premature operation on the ground that they could not tell what was going on inside the abdomen.

MODERN AIDS TO ANAESTHESIA

At the meeting of the Section of Anaesthetics of the Royal Society of Medicine, on November 4th, the new president, Dr. C. F. HADFIELD, opened a discussion with an address on modern aids to anaesthesia.

The adoption, he said, of nitrous oxide, ether, and chloroform for the production of general anaesthesia dated from the years 1844, 1846, and 1847 respectively. It was surprising that later research had not led to the discovery of any agents comparable in value with these three. With the exceptions of ethyl chloride and ethylene, other drugs appeared to be associated with drawbacks which prevented their general use. The demand for ethylene had not been as great as was anticipated when it was first introduced; the unpleasant odour and the danger of explosion had discouraged anaesthetists from using ethylene instead of nitrous oxide, in spite of the better muscular relaxation afforded. Over 90 per cent. of the general anaesthetics administered to-day still depended on nitrous oxide, ether, or chloroform, but enormous improvements had been made in subsidiary treatment, especially by the use of basal anaesthetics. These were administered by the mouth or rectum, into the blood stream, or intramuscularly, with the object of making the patient so drowsy that he was unaware of the administration of the general anaesthetic. With such preparations the amount of general anaesthetic required was usually less. Paraldehyde, the earliest of these basal anaesthetics, administered rectally in either oil or saline solution, seemed to be successful with children, and almost equally so with adults. It was remarkable that paraldehyde was so little used. Avertin was perhaps the most popular basal anaesthetic at the present time. Dr. Hadfield's experience had been that the drug was satisfactory when the amount was limited to the right dose per body weight, but the action on different patients was uncertain. The danger of overheating the solution had probably been exaggerated, though wisely so, but the Congo-red test should never be omitted. Unpleasant after-effects ranged from vague feelings of depression to symptoms sufficient to cause real anxiety. In one case meteorism and partial obstruction had developed after a simple operation for hernia. The barbiturates, especially sodium amytal, pernocton, and nembutal, were receiving attention at the present time. Nembutal could be administered orally or intravenously, whereas the other two were only suited for intravenous injection. Dr. Hadfield preferred to give nembutal by mouth, and had found the results satisfactory. Under either avertin or drugs of the barbituric group the patient showed an increased susceptibility to the action of nitrous oxide. The use of the barbiturates was not always unattended by sequels; the patient sometimes continued to sleep deeply for a period sufficient to cause alarm. A minor complication was the marked restlessness which might precede the return to consciousness, and another effect was depression of the respiratory centre—the breathing might become so shallow that it was difficult to produce surgical anaesthesia, but such cases always responded well to added carbon dioxide and oxygen. The indiscriminate use of CO_2, to correct faults in administration which should never have arisen, ought to be discouraged, and it was not fair to expect the gas to accomplish the impossible when the respiratory centre had been unduly depressed by shock, haemorrhage, or overdose. Dr. Hadfield had not had occasion to use the barbiturates in conjunction with chloroform anaesthesia, but his attention had been drawn to it by the report of a case in which the patient failed to recover consciousness for three days after this combination. So-called synergistic methods in anaesthesia varied from simple combinations to complicated ones in which local infiltration, hypodermic medication, intravenous injection, and/or rectal injection and light general anaesthesia were administered in a single operation. The results were often good, but where trouble arose it was difficult to decide which agent was responsible. In ordinary prescribing the trend was to use the required drug in its simplest form and watch the effect; in the use of the more complicated synergistic combinations there was a tendency to lose sight of this basic principle. The combined use of avertin and local infiltration, however, with or without gas-oxygen anaesthesia, was particularly valuable in operations for toxic goitre. Pure gas-oxygen anaesthesia, given under normal atmospheric pressures, probably imposed more strain on the patient from shock than would have been the case if a minimal quantity of ether had been added. Dr. Hadfield suspected that nitrous oxide was not a genuine anaesthetic at all; after its administration for dental extractions the patient often recovered with a sensation of having been through a severe strain.

Dr. J. Blomfield said that some patients could be drenched with nitrous oxide without anaesthesia being produced. Sodium amytal could be given usefully by mouth as well as intravenously. The theory behind synergistic methods was that the action of two drugs combined was greater than the sum of the actions of each drug singly, but there was evidence to show that this theory was unsound, and that nothing was to be gained by giving a combination of drugs. Dr. R. E. Pleasance had found that gas and oxygen secured deep anaesthesia for gynaecological operations, lasting, on an average, three hours. Avertin was used as a basal anaesthetic ; it was occasionally necessary to add a little ether.

Dr. H. W. Featherstone thought that paraldehyde was used less as a basal anaesthetic for adults than for children, because adults objected to the smell afterwards. He had found CO_2 valuable in the treatment of post-operative hiccup, and had used it in combination with nembutal on such a case recently. The rectal method of administration was more reliable than the oral method in securing basal anaesthesia ; in a nervous patient spasm of the pylorus might prevent passage of the capsule into the small intestine, and consequently the drug was not absorbed. Dr. H. E. K. Eccles said that he had given chloroform fairly frequently after nembutal, and with success. If respiratory depression was marked CO_2 could be given. Dr. Bernard Johnson had given chloroform to a number of patients after using avertin as a basal anaesthetic, and had observed no untoward effects. Dr. R. Jarman thought that with suitable premedication gas and oxygen provided the ideal anaesthetic. He gave nembutal in addition to morphine and scopolamine before operation, and the only objection to gas and oxygen following this premedication was that relaxation was sometimes insufficient for abdominal operations. He had used ethylene in a series of 532 operations on children, and had found it excellent, the only disadvantage being that both he and the surgeon suffered from such appalling headaches afterwards that he had been obliged to forgo its use.

Dr. H. K. Ashworth said that, in his experience, if avertin was given in a uniform manner, ten minutes being taken to administer the solution, the reaction of patients was constant. If relaxation was insufficient with gas and oxygen following nembutal, he preferred chloroform to ether, as it was easier to control and less liable to give rise to spasm of the larynx. The Congo-red test was not infallible unless fifteen minutes were allowed for the reaction to take place. Dr. S. Coffin agreed that some patients suffered from a sense of strain after dental extraction under gas ; this could be avoided by premedication with nembutal and the use of gas and oxygen. Dr. H. P. Crampton suggested an analogy between the effect of mixed drinks and that of mixed drugs.

Dr. Z. Mennell agreed with the president that the good effects of avertin were more uniform if the drug was given by the rectum, but added that the disagreeable effects were likely to be equally uniform. He had had occasion to give avertin in this way to the same patient twice in ten days, and each time she vomited for two days afterwards. When the need arose for her to have a third anaesthetic she asked for, and obtained, another anaesthetist, who also gave her avertin, with the same results. Dr. I. W. Magill said that he had been the second anaesthetist called in, and under his care the patient had vomited for five days instead of two. Ethylene was valuable in chest cases, but gave rise to much nausea afterwards, and could not be given, of course, when diathermy was being used. Paraldehyde had a wider margin of safety than avertin, and occasioned less restlessness. He never tried to produce true basal hypnosis with nembutal by mouth, because it was impossible to be sure of the dose required. Dr. V. E. Vessell said that during the latter part of the war many painful operations had to be conducted under gas and oxygen only, and the results had often been unsatisfactory and horrible.

In reply, the President said that it was dangerous to give too much carbon dioxide or to give it for too long, since the standard of stimulation required by the respiratory centre might be raised so much that the blood could not supply enough CO_2 to keep the centre acting.

PAGET'S DISEASE OF BONE

At a meeting of the Section of Pathology of the Royal Academy of Medicine in Ireland, held in the Royal College of Physicians on October 21st, with the president, Dr. J. McGrath, in the chair, Dr. C. P. Martin showed the skeleton of a case of Paget's disease of the bone.

In this case, Dr. Martin said, no previous clinical history was obtainable. The patient had been a man aged about 62. When the skeleton was obtained by Trinity College it was the first skeleton of this kind in the British Isles, but now there were two similar ones in a London museum. It was almost impossible to articulate the bones because they were so friable. On one side there was fusion between the first and second ribs, but not on the other. The back of the pelvic girdle seemed to be less affected than the front. The skull was extraordinarily thick, but from the outside it did not appear to be unduly large for a man of 62. The mandible was not much affected, and the sternum was perfectly normal.

Dr. Henry Stokes said that for the last three weeks he had had a case of von Recklinghausen's disease under his care in hospital, similar in appearance to Dr. Martin's case of Paget's disease. He considered that Paget's disease was not so rare as was supposed, but that patients with it did not often come to hospital because they got on as well in their own homes. His patient was a woman of about 60. There was a tumour on one finger, but the other fingers were normal. The pelvis was riddled with cysts. He thought there must be some connexion between Paget's and von Recklinghausen's diseases. There was more ossification of the skull in the former than in the latter. Dr. A. R. Parsons said it was a pity no information had been obtained about the parathyroids in Dr. Martin's case. Dr. C. L. McDonogh said that the *x*-ray appearances of the bones in a case of Paget's disease were very interesting. The outer layers were made up of dense layers of cortical tissue with transparent areas between. There was usually expansion of the medullary cavity extending downwards. He had recently seen a case in which the forearms and hands had undergone just as much change as the rest of the body, but the pelvis was very dense and flattened out—much more so than in Dr. Martin's case. The ribs were not very much altered, and the skull was what one would expect in this disease.

Catadyn Process for Water Sterilization

Professor J. W. Bigger and Dr. L. L. Griffiths presented a paper on the treatment of water by the catadyn process. They showed that the catadyn elements when brought into contact with a suspension of *B. coli* possessed bactericidal powers, killing over one and a half million *B. coli* per c.cm. in twenty-four hours. Water which had been in contact with catadyn silver had a similar effect, and seemed to be as efficient in destroying bacteria as the elements themselves. A continuous-flow apparatus was described, and it was demonstrated that a water so grossly contaminated that it would be universally condemned could be rendered bacteriologically pure by twenty-four hours' contact with catadyn silver.

The President said that the apparatus with which Professor Bigger and Dr. Griffiths had carried out their experiments was most ingenious. From these it appeared that even water which had been in contact with catadyn beads had some bactericidal action. He asked if the amount of silver put into the water would have any effect on it (rendering it, for example, unfit for injection) and if any water on which experiments had been carried out had been drunk. Dr. W. D. O'Kelly asked if catadyn sand had any great advantage over catadyn beads, and if it was known what exactly happened to the bacteria—were they adsorbed on the surface or killed in the subsequent storage? He would like to know if the process was very expensive. Dr. Henry Stokes said that this method might be very useful for securing guaranteed sterile cold water in operating theatres. This was sometimes not easy to procure.

Dr. Griffiths, replying, said that catadyn sand cost £15 per cubic foot, but one foot sterilized a million gallons of water, so it was not expensive. Catadyn beads were not yet manufactured in England, but when they

were he was sure the price would be much less. The amount of silver in the water was so small that he did not think there would be any taste from it, or that there would be any danger in using it for injections. No chemical investigations had been carried out on the catadyn water. Spores were the only organisms he had found to be completely resistant.

FAT METABOLISM IN DIABETES

At a pathological meeting of the Liverpool Medical Institution on October 27th, with the president, Professor R. E. Kelly, in the chair, Dr. D. H. Collins read a paper on diabetic lipaemia, with a demonstration of the haemolipocrit.

Dr. Collins summarized the clinical evidence of disordered fat metabolism in diabetes, and discussed the types of lipoids in blood and their relative significance in various conditions associated with high blood fats. Evidence was given that diabetic lipaemia was endogenous in origin, as compared with the exogenous type following fat feeding. He gave a description of Rückert's haemolipocrit, and compared its reliability with the Schimidzu method of blood-fat estimation. The haemolipocrit had the advantage of requiring neither special technique nor special apparatus, and only a small amount (0.15 c.cm.) of serum. Dr. Collins showed tables of the blood-fat readings taken by the haemolipocrit in a series of cases. In fifty-five non-diabetics the average serum fats were 0.571 c.cm. per cent., and in 103 diabetics under treatment 0.818 c.cm. per cent. There was an exaggeration of the lipaemia in those cases with glycosuria, and a further increase in those with acetonuria. He presented the following conclusions: (1) that the more severe cases of diabetes, as judged by other standards, presented higher blood fats; (2) that there was no parallelism between the variations of the sugar and of the fat contents of the blood, and that the latter were more stable; and (3) that insulin when given in large amount decreased the blood-fat concentration. The opinions of other workers that high blood fats were indicative of grave prognosis in diabetes were confirmed. The speaker suggested that the explanation of the lipaemia in diabetes was that as the katabolism of carbohydrates was interfered with to a greater or less degree, so the mobilization of fats was provoked in order to meet the calorific requirements of the body. Lipaemia was apparently, therefore, a symptom of diabetes, which could be estimated and recorded if additional guidance was required in diagnosis, prognosis, and treatment.

In the discussion which followed Dr. J. R. Logan stated that he had had a case of fatal diabetic lipaemia in 1881—the first time such was diagnosed in the living. In this case there was an enormous amount of fat in the blood, and it seemed that the urgent symptoms terminating with coma had only lasted about seven hours. How such a profound change could take place in so short a time was not easily explained, even now. Dr. E. Cronin Lowe pointed out that there was a considerable clinical value in knowing something more definite with regard to the fat metabolism present in diabetes, and it was of interest to observe in the details given of cases that acetonuria was invariably associated with this definite increase in blood lipoids. Although in advanced cases and those with acetonuria it would be of advantage to record any abnormal finding in the lipoid content of the blood, it was unlikely that in ordinary cases of diabetes this further examination would really be of any clinical advantage compared with the more easily observed blood sugar variations. Dr. Lowe asked Dr. Collins whether he had observed any increase in the lipoid content of blood serum in cases of malignancy. In a series which he himself had examined the fat content of malignant blood was fairly consistently increased above normal. The whole subject had an interesting bearing upon the researches of Shaw-Mackenzie and his observations on the deficiency of a lipolytic-enzyme content in the blood as compared with the normal, and his suggestions that this probably depended upon some complex endocrine deficiency in which the pancreas at least was associated.

Reviews

ARTIFICIAL PNEUMOTHORAX

It is not necessary for us to use up space in commenting on the technical parts of Dr. L. S. T. Burrell's book *Artificial Pneumothorax*.[1] Dr. Burrell's experience and mastery of this section of the treatment of pulmonary tuberculosis are so well known that any learner wishing for a book on the subject will put in his order for this one as soon as he hears of its publication, without waiting for the advice of the medical Press. The reader, hitherto inexperienced in the treatment of tuberculosis of the lung, who seeks instruction will here receive a firm foundation on which to build his experience; and though, as that experience increases, he may meet with alternative teachings on some of the more intricate details of collapse therapy, he will always be safe in following Dr. Burrell's until he is in a position to form his own opinion.

In addressing this book to the general practitioner who may be anxious to undertake collapse therapy himself, or who wishes to learn of its possibilities in the treatment of his patients, the author is unnecessarily limiting his public, and we shall be doing a service by insisting that his book really has a much wider scope. Our tuberculosis service is large, and has enlisted men of every grade of experience, many of whom are pitchforked, even during their initiate stage, into districts where they are confronted with a great quantity of tuberculosis but where they are so isolated that they have not the chance of checking their work against that of their more experienced colleagues. For such, apart from pure technicality, there is much in this small book that will be of great value: even the fully experienced will find much of interest in it, and it should give them a fresh point of view on what they have for years considered to be unassailable methods. Forlanini is quoted as saying: "Do an artificial pneumothorax when life is threatened." Burrell says: Do it, in the appropriate case, before life is threatened and before valuable time is wasted. But he does not hand out artificial pneumothorax to his patients like haustus sennae co. A careful assessment of the case must be made first, and his dictum that artificial pneumothorax is mainly of use in the advancing exudative type of disease, and of less use or absolutely harmful to the chronic fibroid type (the type for thoracoplasty), which is insisted on throughout the book, is a witness of this critical attitude.

Experience alone can give efficiency, but here we have a good grounding for the student and (as a Victorian practitioner might describe it) a mild alterative for the tuberculosis physician.

SERO-DIAGNOSIS OF SYPHILIS

Much of the matter composing *Microscopic Slide Precipitation Tests for the Diagnosis and Exclusion of Syphilis*,[2] by B. S. Kline, has already appeared in various medical journals. Here it is brought together in one small volume, divided into four parts. The first consists in a comparison between complement-fixation and flocculation tests, and shows that whilst the former are much more complicated the latter are simpler and distinctly more sensitive. Part II deals with the factors concerned in flocculation tests, the different sources of antigens, the

[1] *Artificial Pneumothorax*. By L. S. T. Burrell, M.A., M.D., F.R.C.P. Practitioners' Series. London: William Heinemann (Medical Books), Ltd. 1932. (Pp. vii + 174; 13 figures, 16 plates. 12s. 6d. net.)

[2] *Microscopic Slide Precipitation Tests for the Diagnosis and Exclusion of Syphilis*. By B. S. Kline, A.B., M.D. London: Baillière, Tindall and Cox. 1932. (Pp. xviii + 99; 28 figures. 13s. 6d. net.)

roles of the various ingredients of antigen emulsions, how different methods of mixing these alter their properties, and the general mechanism of the reaction. Part III is devoted to a description in detail of the author's different tests. These consist of both diagnostic and exclusion tests with heated and unheated serum, defibrinated blood, and spinal fluid respectively. Part IV consists largely of tables showing the relative sensitivity and specificity of the slide tests compared with various Wassermann reactions and the Kahn test.

About the sensitiveness of the Kline test there can be no two opinions: as regards its specificity estimates vary. In the author's own hands results appear to have been very good, but more than one worker has reported an undue number of "false positives." Possibly this is not the fault of the test, but due to impurity in one or more of the ingredients—for example, the cholesterin. It would be interesting to see how the test would stand a strict comparison such as that of the Serum Conference at Copenhagen or the more recent one at Monte Video. Once the stock antigen has been made the test is a model of simplicity and rapidity, both in respect of setting up and of reading.

The volume is well got up and the numerous figures are clear and admirably displayed; the photomicrographs are excellent. A full bibliography is appended, and there is a good index. It is a little book that can be confidently recommended to all who are interested in serology.

BONE JOINERY

Osteosynthesis is another name for the operative treatment of fractures, and Professor R. Danis of Brussels has provided us with a useful guide to certain ways of its practice in his *Technique de l'Ostéosynthèse*.[3] Ever since the days of the introduction of Arbuthnot Lane's plates there have been two schools of thought among those surgeons whose work lies largely in the treatment of simple fractures, the one school advocating free exposure of the bone ends and their fixation by means of plates or other retentive appliances, and the other relying upon the older methods, which did not require the conversion of a simple into a compound fracture. A committee was appointed by the British Medical Association in 1910, and reported on the subject in 1912 (*British Medical Journal*, 1912, ii, 1505). One of the pronouncements of that committee was that "the most certain way to obtain a good functional result is to secure a good anatomical result." In many cases this can only be done by open operation, and the reviews in our columns during the last twenty years show that, particularly on the Continent, surgeons have turned their attention to the elaboration of the technique of bone joinery. Hey Groves in this country and Lambotte in Belgium have been leaders in this line of treatment. As it is admitted that there is an uncertain percentage of fractures that can only be satisfactorily treated by internal splinting, such books as that now under notice, which give full descriptions of apparatus and methods of using it, must be welcome.

In an introduction Professor Danis touches on the conditions desirable for successful bone plating, and calls attention to the bad effects of too free interference with the soft parts. Restoration of the periosteum, he says, is as necessary as restoration of the peritoneum after abdominal operations. Internal splintage cannot safely be trusted to enable us to dispense with external splintage, but it should enable us to reduce the latter so that the joints above and below the fracture, in cases involving the shafts of the long bones, may be left free, allowing early movement. The importance of firm fixation of metallic plates, collars, or bands, and of bone grafts, has been insisted on by Robineau and Contremoulins, as well as by the author. If it is complete he holds that the nature of the foreign body is of little importance as regards its tolerance by the tissues. Other things being equal, he prefers bronze and stainless steel as materials. To sum up, "strict asepsis, avoidance of extensive dissections, coaptation and absolute fixation of the bony fragments, avoidance of isolated points of pressure, as well as a reasonable liberty of action allowed to the muscles during convalescence, constitute the conditions which should lead to the success of osteosynthesis."

Professor Danis pleads guilty to the charge of having rendered the armamentarium of bone surgery even more formidable, while looking forward to the day when it will have regained its character of simplicity. Till then such books as this will be needed to explain the methods of the bone-joiner. Chapter I describes methods of reduction and its maintenance, including a special extension table and apparatus for controlling the fracture during operation. Chapter II deals with bone suture, Chapter III with the treatment by sheath or sleeve, Chapter IV with special (helicoidal) screws, having prominent plate-like threads which give a great hold on bone; these are intended for use in spongy bone, and seem likely to be of great value. Chapter V deals with bone grafts, and describes elaborate methods of making screw dowels of living (autogenous) bone. Chapter VI is on radiography before, and Chapter VII after, operation. In Chapter VIII fractures of the various parts of the skeleton are dealt with seriatim. This is a book worth study by all surgeons engaged in the treatment of fractures. The illustrations—to the number of 149—are clear.

INDIVIDUAL PSYCHOLOGY AND SEX

Three lectures by Dr. F. G. Crookshank, on *Individual Sexual Problems*,[4] with a short preface by the author, form No. 14 of the medical series of "Psyche Miniatures." The first two were delivered in 1929 to a non-medical audience, and are reprinted from the periodical *Psyche*. The third, an address given last year to the Essex Branch of the British Medical Association, conveys in general terms, but with reference to some particular cases, the attitude of individual psychology towards problems of sexual maladjustment. The social implications of Alfred Adler's teaching and the need for co-operation in all the affairs of life are set out in simple language, with illustrations of sexual failure—and success—drawn from everyday life.

Dr. Crookshank has contributed also a thoughtful introduction to the English translation of *Individual Psychology and Sex*,[5] by Erwin Wexberg, one of Alfred Adler's leading collaborators in Vienna. As the individual passes through life, Dr. Crookshank points out, he or she is faced with three great demands or problems: those of subsistence, society, and sex. The sexual problem, while not the most important or even the basic problem of psychology and sociology, happens to be the most interesting and the most important of these problems because it is the least understood. Moreover, the school of Adler regard the manner of any individual's solution of his own sexual problems as an indication of his life-style; and unless the whole style of life is appreciated by the

[3] *Technique de l'Ostéosynthèse. Étude de Quelques Procédés.* Par Robert Danis. Paris: Masson et Cie. 1932. (Pp. 160; 149 figures. 55 fr.)

[4] *Individual Sexual Problems.* By F. G. Crookshank, M.D., F.R.C.P. Psyche Miniatures, Medical Series, No. 14. London: Kegan Paul, Trench, Trubner and Co., Ltd. (Pp. 150. 2s. 6d. net.)

[5] *Individual Psychology and Sex.* By Erwin Wexberg, M.D. Translated from the German by W. Béran Wolfe, M.D. With an Introduction by F. G. Crookshank, M.D., F.R.C.P. London: Jonathan Cape. (Pp. 223. 7s. 6d. net.)

individual the error leading to the original difficulty will be repeated on subsequent occasions, whether the later problems be social, sexual, or those of subsistence. Hence, while discouragement is the worst of remedies, encouragement to helpful, personal effort is the best. With this clue to the author's underlying motive the general reader should find little difficulty in following Dr. Wexberg through his exposition.

NATIONAL HEALTH INSURANCE

Books on national health insurance and its relation both to other public health activities and to other forms of social insurance are now making their appearance with noticeable frequency. This may be all to the good, for not only does the present world economic crisis make careful reconsideration necessary, but there are many different points of view from which the subject may be regarded. There is Sir Arthur Newsholme's comprehensive but not unprejudiced review, recently noticed in the *Journal* (October 1st, p. 632), which cannot be ignored by anyone wishing to arrive at a well-informed judgement. There is Harris and Sack's *Insurance Medical Practice*, which will remain the indispensable *vade mecum* of the insurance practitioner for many years to come. A very valuable supplementary volume to these is a relatively short book entitled *National Health Insurance*,[6] by Dr. G. F. McCleary, who has just retired from the position of a deputy senior medical officer to the Ministry of Health. It is based upon two lectures given by the author in the School of Hygiene and Public Health in the Johns Hopkins University, and will be found to contain just that general description of national health insurance services, and just such details relating thereto, as will help both the general student of public health and social welfare and the busy insurance doctor who wishes to understand the relation of his daily work to social movements and conditions in this country and abroad.

The book gives a clear, interesting, and brief but sufficient account of the historical development of voluntary and compulsory health insurance schemes. It describes the scope, organization, and general finance of such schemes both in Great Britain and elsewhere. It is quite up to date in this respect, giving accurate and important information, not merely of recent modifications of the services in this country and in Germany, but of the more revolutionary changes made in Norway and of the new scheme of social (including health) assurance which was begun in France two years ago, and is likely to have considerable influence on the future development of such schemes everywhere. The English scheme is then described in more detail, and certain recent disputes and difficulties are noted. Finally, the general social value of national health insurance is demonstrated and the line of further progress indicated.

All this is, within its scope, well done. If two points may be offered for the author's reconsideration they are these. Some of the details given about the introduction of the English scheme in 1911 and thereabouts seem a little out of proportion and now unnecessary. Some of the controversies of that date are best ignored or forgotten, and it is difficult to describe some of them in a sentence or two with exact justice. Again, after stating that as a result of two investigations into insurance medical certification, the conclusion of the Ministry of Health was that "a considerable number of certificates of incapacity have been issued which were not justified," it is scarcely adequate merely to say in a footnote, "some of the conclusions drawn from the facts stated in this memorandum were not accepted by the British Medical Association," even though the reference to the Association's reply is given. It should at least have been made clear that the Ministry's contention that the main cause of the increase in sickness and disablement benefit claims was lax medical certification had been categorically denied, and that it was contended that the paramount cause was a rationally explicable marked increase in legitimate claims made by insured persons. This latter contention is now admitted by most persons to be the only logically tenable explanation.

[6] *National Health Insurance*. By G. F. McCleary, M.D. London: H. K. Lewis and Co., Ltd. 1932. (Pp. x + 186. 6s. net.)

A TEXTBOOK OF NEURO-ANATOMY

In preparing his textbook of neuro-anatomy[7] Professor Kuntz says that his object was "to give the student an adequate conception of the human nervous system early in the course." This endeavour to make an admittedly difficult subject simple has not been fortunate, and if the book finds a sphere of usefulness it will be among students who have already laid down a sound foundation of knowledge from more systematic and better proportioned works. It is certainly not a textbook to be recommended to anyone embarking for the first time upon the study of the nervous system. The field which it attempts to cover is too wide for a work of this size. Ontogeny, phylogeny, and macroscopical and microscopical anatomy are all dealt with in a superficial manner, and excursions are made into physiology and clinical neurology. None of these are studied thoroughly.

The anatomical drawings and cross-sections are good, especially the forty taken from Gray's *Anatomy*, which appear with their usual clearness enhanced by contrast with the obscurity of the diagrams of tracts and nuclear connexions largely reproduced from *The Vegetative Nervous System*, by Huber and Crossby. A diagram to be of value should convey to the reader at a glance the essential points of the text it is designed to illustrate. To understand the maze-like entanglements presented in this book it is necessary to re-read the text, and to work carefully through a twelve-line explanation in small print! Obscurity reaches its depth on pages 343 and 344, where diagrams to explain aphasia and apraxia are inserted without any reference in the text or any key to the symbols used.

The author's personal bias is very evident in the description of the structure and connexions of the diencephalon ; and hypotheses as to its function, which are in fact, highly speculative, are presented as though they were as well established as the decussation of the pyramidal tracts. The chapters on the cerebral hemispheres and the neuroglia are both clear and up to date. The bibliography throughout is adequate, and constitutes the most useful feature of the book. Apart from this, there is nothing of value that the reader will not find in a more succinct form in the classical textbooks already at his disposal.

[7] *A Textbook of Neuro-Anatomy*. By Albert Kuntz, Ph.D., M.D. Philadelphia: Lea and Febiger. 1932. (Pp. xii + 359 ; 197 figures. 5.50 dollars net.)

Notes on Books

Dr. Philip Gosse, whose interest in pirates and their doings is well known, now issues a *History of Piracy*,[8] complete from 78 B.C. to 1872, when the last white man pirate was hanged in the Tombs prison. Dr. Gosse tries to show the underlying principles which led men to enter upon an occupation which flourished for so many years. Speedy wealth without counting the cost was the main object, though pure love of adventure counted for much. The supply of pirates in Europe varied with local conditions. When the great nations treated their seamen badly, fell into arrears with their pay, fed and housed them

[8] *The History of Piracy*. By Philip Gosse. London: Longmans, Green and Co. 1932. (Pp. xiv + 349 ; illustrations and maps. 15s. net.)

disgracefully, men deserted and took their own remedy; after every great war many masterless men who were out of employment joined the pirate ranks; these were low-class fellows and blackguards. There remained a select few for whom love of adventure made piracy a sheer joy. Piracy ceased when the high seas were properly policed, and when improvements in road construction made transport by road easier and cheaper than carriage by sea. Dr. Gosse tells a wonderful story, always in restrained language. There were male pirates and female pirates, and the women like Anne Bonney, Mary Read, the widow Ching, and Mrs. Lo outdid the men. Dr. Gosse gives pictures of them. But if the pirate chiefs were surprising their crews were no less so. Graduates of Oxford and Cambridge were to be found amongst them, many noblemen, perhaps one Archbishop of York, priests often, poets and naturalists not uncommonly; surgeons always, attached with regular pay and a prescribed share of loot when there was a share-out. Dr. Gosse notes them all. Their captives were equally wonderful: at least one saint—St. Vincent de Paul; a great soldier—Julius Caesar, who hanged his captors and got his ransom returned intact; a fine writer—Cervantes, who escaped death to write *Don Quixote*. The whole history is marvellous, and is full of moving accidents by flood and field. The author has taken great pains to verify his statements, and gives no fewer than six pages to a bibliography of the authorities he has consulted. There is a good index, and the book is well and appropriately illustrated. It should certainly be read by everyone who is interested in an occupation which is under a cloud at present, but is not incapable of reappearing with its original glamour as soon as conditions of world dissension allow.

A little work[9] by Dr. Lionel Calthrop is intended to give, in brief compass, all that a bath attendant or assistant should know of the principles and practice of hydrological treatment. The section on radiation and electrical treatment occupies a much smaller space, and is necessarily condensed. After a short summary of the principles of balneotherapy, Dr. Calthrop gives in some detail the "reaction effects" of air and water, at different temperatures, upon the body. It is surprising how little the importance of these reactions, produced in every form of bathing, is realized even by the medical man; and it is especially necessary that the bath attendant who observes the patient under treatment should know at least the essential facts, and be trained to recognize, record, and report to the medical man the reactions, favourable or unfavourable, that occur in daily practice. The author has done well to emphasize the careful instruction and demonstrations that are obviously necessary for this purpose. Most of the methods and procedures of systematic hydrotherapy are described in detail. The author has omitted to describe long-continued baths used in surgical cases, and the "sedative pool" used for many years for insomnia and mental cases, and more recently in certain cardiovascular conditions. In this section the short paragraphs on "therapeutic effects" might well be expanded; and a clearer account given of sedative, as distinct from stimulant, hydrotherapy. The chapter "Water in Motion" contains much useful information, but here again the indications might be more clearly laid down.

The ingenuity of most people would be taxed to think of even a dozen popular fallacies, chiefly because we all find it difficult to recognize our own fallibility. In *One Hundred Popular Fallacies*,[10] however, Dr. Charles W. Budden has put salt on the tails of a good round number, and shows genuine enjoyment in wringing their necks. The articles appeared first in *Maternity and Child Welfare*, and many of them deal with fallacies which have arisen in connexion with the management of infants and young children. He ranges from the dangers of rice pudding to the virtues of vaccines, from the right of the child to ask questions to the diet of the adolescent, and covers various problems, moral as well as physical, in the process. His criticisms are rarely misplaced, but he is perhaps a trifle reckless in his condemnation of sweets for children, if, as we are told, sweets are sometimes the salvation of the sugar-starved child. He has the art of making home truths palatable, and the book is one which parents of young children should find entertaining as well as useful.

Physiologists should be surprised, if not particularly pleased, by a challenging book, *Excitability: A Cardiac Study*,[11] by Professor W. Burridge. It is indeed so challenging, in some respects, and is so much in defiance of all the established canons of physiological thought and work, that the reviewer admits to finding it too much for his conservative, and perhaps old-fashioned, ideas. He regards it, in fact, as a minor fault of the work that some of his major conclusions are based on results of perfusions of the frog's heart with 5 per cent. potassium chloride. This is said to have a recuperative action on the heart. In one of the chapters, entitled "Response, Magnitude, and Prevarication," and apropos of the action of 40 per cent. alcohol on the frog's heart, science and religion are brought into harmony in a discussion on the celebration of Mass in the Catholic Church. Apart from this sort of thing, and setting aside the author's low opinion of other physiologists, the book is interesting enough and contains some useful analogies.

The fourteenth edition of *The Annual Charities Register and Digest* is now available, and the Charity Organization Society is again to be commended for producing a valuable reference book giving essential information about the numerous and varied bona-fide charitable institutions, societies, etc. The arrangement of the volume is exactly similar to that of previous issues, and a carefully prepared index makes reference to the contents an easy matter. The book can be obtained from the offices of the association (Denison House, Vauxhall Bridge Road, S.W.), or from Messrs. Longmans, Green and Co., Ltd. (39, Paternoster Row, E.C.), price 8s. 6d. net.

The 1932 edition of the *Regulations for the Medical Services of the Army* can be obtained from H.M. Stationery Office, price 3s. 6d. net. In includes all amendments up to February 29th, and is arranged on the usual lines. Careful arrangement of the sections and the provision of a useful index enable quick reference to be made to any subject, as regards both administrative details and therapeutic suggestions.

[9] *Hydrotherapy and Physiotherapy for Bath Attendants, Nurses, and Biophysical Assistants.* By Lionel C. E. Calthrop, M.B., M.R.C.S., L.R.C.P. London: W. Heinemann (Medical Books) Ltd. (Pp. xi + 172; 10 figures. 5s. net.)

[10] *One Hundred Popular Fallacies.* By Charles W. Budden, M.A., M.D., Ch.B. London: John Bale, Sons and Danielsson, Ltd. 1932. (Pp. viii + 162. 3s. 6d. net.)

[11] *Excitability: A Cardiac Study.* By W. Burridge, D.M., M.A. Oxon. Oxford Medical Publications. London. Milford, Oxford University Press. 1932. (Pp. x + 208; 15 figures. 16s. net.)

Preparations and Appliances

LUMBAR CUSHION FOR THE OPERATING TABLE

Lieut.-Colonel R. C. McWatters, I.M.S., writes: To prevent the backache so common after severe or prolonged operations it is a useful practice to place a small pillow under the lumbar spine, thereby relieving it and the hip-joints from

strain. But the pillow is liable to be forgotten, and in certain cases it becomes soiled with blood, urine, or other discharges. Messrs. Down Bros. supply a sponge rubber pad with a covering of impervious sheet rubber for the operating table, and have modified it to my requirements by thickening it under the lumbar concavity in order to give the necessary support to the back. It is readily cleaned, and, being part of the permanent equipment of the table, it is always in place. I have had it in use for a year, and find that it adds appreciably to the patients' comfort in the days following operation.

British Medical Journal

SATURDAY, NOVEMBER 12th, 1932

OBSTETRIC EDUCATION IN THE UNITED STATES

President Hoover's White House Conference on Child Health and Protection, called in 1930, drew up an elaborate scheme of investigation, which was entrusted to four main sections. A large number of subcommittees were appointed, to each of which a specific area of inquiry was allotted. Six subcommittees were formed to consider the subject of pre-natal and maternal care; one of these was delegated to examine the question of obstetric education in the United States. The result is given in a volume of 300 pages,[1] which has been edited by Dr. Lyman Adair of Chicago, and to which all the best-known American teachers of midwifery have contributed. The investigation deals solely with the conditions which now exist in the United States, and which are, of course, without parallel in this or in any other European country. A perusal of the report, however, makes it clear that obstetric problems are much the same in countries which differ widely in racial characteristics, or in social and economic conditions.

The problem of maternal mortality in America is even more serious than our own, for its full extent is not even known. In many of the forty-eight States it is not compulsory to register births, and the birth registration area, which is expanding gradually, comprises in the main those States which are the wealthiest and the best organized, and which contain a predominantly white population. In the birth registration area the maternal mortality has remained for the last ten years between 6 and 7 per 1,000 births, and shows no indication of decline. In the States where births are not registered it is agreed that maternal mortality must be much higher than this. It will be recollected that the comparable figure for England and Wales is 4 to 5 per 1,000 births. The conclusion at which the American obstetric authorities have arrived is that "this high maternal mortality is a reflection on the training and education of the personnel responsible for furnishing maternity care." In consequence an elaborate and painstaking inquiry was made into the methods of training doctors, midwives, and nurses over the whole of the United States.

It is estimated that there are some 47,000 women in the United States "who act as midwives," but only a small proportion of them have received any training whatever. The greater number attend the women of the negro population, and there are no statistics of their results. Midwives attend roughly 15 per cent. of the total number of births. The City of Philadelphia has trained and educated midwives under the State Bureau of Medical Education since 1914. In the period 1914–30 these midwives attended 91,000 births with a maternal mortality of 0.2 per 1,000, a result which can hardly be excelled in this or perhaps in any other country, and which, it is evident, has profoundly impressed the American authorities. The States of New Jersey, New York, and Pennsylvania now have large numbers of white midwives practising, and increasing attention is being paid to their training and to the supervision of their work. There are only two schools throughout the country organized for the training of white women as midwives, and none to which negro women can go. Nevertheless, the conclusion arrived at is that "at the present time the midwife is a necessity, and every effort should be made by the profession to improve her as rapidly as possible." It is evident that in regard to the training and employment of midwives in the United States there is much still to be done. Some of the difficulties with which America has to contend are peculiar to that country. Each State makes its own laws governing the training and licensing of doctors, midwives, and nurses, and there are wide divergencies in the requirements of different States. Further, there are two varieties of licensed "drugless doctors"—the osteopaths and the chiropractors—to be found in every State. In a few the "drugless doctors" are allowed to practise obstetrics without restriction. In others they can practise midwifery, but may not give drugs or perform operations. No State allows this privilege unless obstetrics is included in the examination for the degree or diploma in osteopathy or chiropractic. In many States osteopaths are licensed as doctors of medicine with full powers; in only three are they expressly forbidden to practise midwifery. The report gives no information as to the extent to which "drugless doctors" avail themselves of the privilege of attending pregnant women.

The ordinary obstetric training of the medical undergraduate varies widely in different States, and the general level of efficiency attained leaves a good deal to be desired, as the following statement shows. "In so far as obstetrics is concerned the majority of students at the time of graduation are not qualified to assume the responsibilities of caring for maternity cases. . . . Less than half have delivered any woman up to the time of graduation." On the other hand, some States require a year's service in internship after graduation before the State licence to practise is granted, and two of these require that six weeks of obstetric service should be included in the internship with attendance upon at least six confinements. In the majority of States it appears that, although graduation does not carry with it the right to practise, licences are in fact granted without further requirements being made. The American obstetricians are keenly alive to the disadvantages of this system, and they make the general recommendation that "a rotating internship of one year, embracing a satisfactory maternity service, should be required for

[1] *Obstetric Education.* Report of the Subcommittee on Obstetric Teaching and Education. White House Conference on Child Health and Protection. New York: The Century Company; London: D. Appleton and Co. 1932. (15s. net.)

licensure to practise medicine." This is, without doubt, an ideal project, but clearly it would be impossible of realization under present conditions in this country.

In only one respect does our own faulty system of obstetric education seem to compare unfavourably with American conditions. Reference has been made in these columns[1] to the fact that, "generally speaking, the men who become consulting physicians or surgeons or specialists in this country are not in fact trained for their most responsible work except in a certain desultory and haphazard manner." In America the problem of the training of the professor and the specialist has been attacked with great courage. There are eleven medical schools which have established "courses to prepare men to hold professorships." In nineteen schools there are also courses definitely designed for the training of specialists to practise in obstetrics and gynaecology, the period of training varying from two to seven years. One such school accepts five men for training. The status of junior members of the staff appears for the time being to be given to the candidates. No mention is made of an examination test at the end of training, but the degree of M.S. in obstetrics or of Ph.D. is granted by some of the schools, presumably those affiliated to a university. The results of this method of training specialists will be watched with great interest, for it may well contain the elements of a system adaptable to the requirements of other countries. As an intermediate step "graduate courses" of at least one year in duration have been established for the study of special subjects; details are given of such courses in obstetrics in twelve different schools. In certain instances the degree of Ph.D. in obstetrics is awarded at the end of this course, a striking instance of the unequal value which attaches to university degrees in the United States. Facilities for post-graduate education of a practical character, suitable for the needs of general practitioners, appear to be almost as inadequate and as ill organized as in this country.

A UNIFIED MEDICAL SERVICE

The trend of progress in modern medicine has been described, in general, as being from pathological to biological. More and more it is to the understanding and maintenance of health that attention is directed rather than to the cure or amelioration of established disease. The main tasks are becoming recognized as those of improving the external environment in which the individual lives, and of securing that physiological balance which should constitute the proper internal environment in which the cells and tissues and organs of the body function. The primary object is becoming the early discovery and reparation of small departures from the standard of health, in place of the adoption of measures to make their progressive course less painful or to postpone their fatal termination. In proportion as these new ends are definitely and consciously pursued, so does the distinction between the curative and preventive aspects of medicine tend to disappear; so also does the contrast between the sphere of community health and the sphere of individual health tend to become less real or important. The successful accomplishment of these primary and paramount aims calls for a new conception both of medical education and of medical relations and arrangements. In medical education it has become much more important to insist upon a knowledge of biology in the preliminary stages; but it is in the main an alteration of emphasis and proportion, rather than of content that is needed. It is essential, too, to have a clear conception of that body of knowledge and that understanding of principles—the institutes of medicine in the widest sense—which must be possessed by all entrants to the profession at the time of graduation, and of that further knowledge and wisdom which they must acquire through post-graduate instruction and experience.

The new conception of medical relations required is something more than a realization of the need for co-operation among different branches of the profession, and something more than a suitable delimitation of the respective spheres of the public health service and of private medical practice. Of recent years the increasing overlapping of these spheres, and the growing clash of interests so produced, have sufficiently demonstrated the urgent need for reconsideration of the position. The private practitioner, the public health medical officer, and the research worker form a triumvirate upon whose united work all medical and health progress depends. The question of their relative importance should never be raised, though their exact relation to one another within the limits of a unified service may well be the subject of discussion. The idea of separate and isolated, even if friendly, spheres should be finally abandoned: the harmonious organization of their combined work within a single sphere should be taken in hand. This will need a readjustment of the notions of many individuals within each class; nevertheless, though difficult perhaps, it is imperative. Further, the new conception of relations inherent in the modern medical outlook embraces the relation of the medical profession as a whole to a large body of other workers whose efforts are essential in any comprehensive health service, such as midwives, school nurses, social welfare workers, and health visitors of various kinds. These have been regarded hitherto mainly, and some of them wholly, as subordinates of the medical officer of health, responsible to him and to his chief colleagues in the service alone. They have tended in some instances to become, or to look upon themselves, as rivals to the general practitioner within certain restricted spheres. In a service of the nature now required they would be as much helpers of the family doctor as assistants to an administrative superior. They would perform, under his direction, administratively controlled, exactly such functions as are now needed to make his preventive work less harassing and more effective.

If the paper by Dr. Ralph H. Crowley, senior medical officer to the Board of Education, which he read in

[1] *British Medical Journal*, August 8th, 1931.

the Section of Diseases of Children at the recent Centenary Meeting of the Association, and which we print at page 875 of this issue, be read in the light of these considerations, it will be seen how great a service he has rendered the profession by placing before it, in so clear and thoughtful a fashion, the ripe results of his experience, leading him to conclusions essentially similar. He illustrates the need for preventive work and the need for well-planned team work from the four examples of the crippled child, the rheumatic child, the delinquent child, and the child with defective vision ; and demonstrates the need for a completely unified service, and the pivotal position of the family practitioner therein. In future discussions it will be impossible to ignore the point of view which he here presents.

THE KALA-AZAR PROBLEM

In 1931, owing to the decline in the kala-azar epidemic in Assam and the increasing difficulty of securing suitable cases of the disease from which to obtain material for experimental work, it was decided to bring the commission (1924–31) to a close. The report[1] which has just appeared is the second of the commission, and describes the results obtained between the end of 1925, when Colonel H. E. Shortt succeeded Sir S. Christophers as director of the commission, and its termination in 1931. The report includes a number of papers already published and nine others which are published for the first time. The work undertaken has been chiefly directed towards the discovery of the method of transmission of the disease. It had been hoped at the beginning of the period that the discovery that the parasite of Indian kala-azar would develop very readily in the sand-fly *Phlebotomus argentipes* would soon be followed by the demonstration of the method by which this sand-fly transmitted the disease. This hope has not been realized, for, in spite of feeding experiments involving thousands of infected sand-flies and highly susceptible animals like the Chinese hamster, and even human volunteers, in only one instance has infection been transmitted to a Chinese hamster by the bite of infected sand-flies. This failure has led the commission to cast about for other methods of infection in which the sand-fly might or might not play a part. It was demonstrated, for instance, that the parasite of the disease might escape in the urine or even in the faeces when dysentery occurred, and of a series of hamsters fed on the urine or faeces of cases of kala-azar or of experimentally infected animals one which had been fed on the faeces of infected hamsters itself became infected. Furthermore, it was shown that a healthy hamster in a cage which was in close contact with another cage in which an infected hamster was kept might contract the disease. It was definitely proved that within a week of feeding on an emulsion of liver and spleen of an infected animal parasites could be demonstrated in the internal organs, and that up to forty-eight hours after feeding they could still be detected apparently unaltered in the intestine. The parasite, moreover, can survive in sterile milk or even on the surface of sterile soil moistened with water or urine. All these facts show that oral infection is possible, but no evidence was obtained that such direct infection between human beings occurs in nature. Another possibility was offered by the experiments which proved that hamsters could acquire an infection by eating crushed infected sand-flies. It seems possible that, in nature, infected sand-flies might be drowned in water intended for human consumption. Again, no evidence was secured to show that this is the method of spread of the disease. The report gives details of the above and other experiments, all of which are of the greatest importance for the solution of the kala-azar problem. It is clear that the remarkable development of the parasite in the sand-fly throws grave suspicion on this insect, but the failure to produce infection readily by its bite should indicate that other methods of infection still have to be considered. It is pointed out in the report that it is possible that before infection will occur susceptibility may have to be increased by some factor such as malaria. It is noted that of the two great epidemics of kala-azar which have occurred in Assam the one was preceded by a devastating earthquake and the other by an equally devastating pandemic of influenza. It seems possible that the explanation of the spread of kala-azar in Assam will not be found till another epidemic affords abundant material of the kind necessary for experimental work.

[1] Reports of the Kala-Azar Commission, India. Report No. II (1926–1930). Director-Lieut.-Colonel H. E. Shortt, I.M.S. *Indian Medical Research Memoirs*, Supplementary Series to the *Indian Journal of Medical Research*. Memoir No. 25. 1932. Calcutta: Thacker, Spink and Co., Ltd. (Rs.5.8, or 8s.)

PRESENTATION TO SIR STCLAIR THOMSON

Sir StClair Thomson has been presented with his portrait by his fellow members of the Section of Laryngology of the Royal Society of Medicine. In making the presentation, at the meeting of the Section on November 4th, the retiring president, Mr. W. G. Howarth, said that it had long been desired by the members to mark their appreciation of the distinguished services which Sir StClair Thomson had rendered to laryngology, and when the opportunity arose of acquiring the portrait painted by Adrian Klein it was immediately embraced. Sir StClair Thomson was one of the pioneers of British laryngology, and had devoted himself during laborious years to the advancement of this specialty, through many misunderstandings and discouragements. Few things, said Mr. Howarth, had contributed more to that advancement than the researches and encyclopaedic knowledge embodied in Sir StClair's own textbook. But he had been more than a pioneer and layer of foundations ; he had also been an ambassador. By his many journeys abroad, his fluency in languages, his friendships with Continental laryngologists, and his membership of foreign societies, he had established the recognition of British laryngology far and wide. Above all, he had been the friend of laryngologists, a man of proverbial hospitality, and one who had done much good by stealth. Sir StClair Thomson, in returning thanks for the portrait, said that when, forty years ago, shyly and modestly, he crept into the back row at the meetings of the old Society of Laryngology, he little anticipated such an occasion as the present. With Rosencrantz in *Hamlet*, he held ambition " of so airy and light a quality that it is but a shadow's shadow." Oscar Wilde had said that there was only one thing more disappointing than failure,

and that was success. Without endorsing that sentiment, he rather felt like the man at the end of the war whose breast was decorated with a great array of medals, and who, when asked how he got them all, replied, "This first one came to me by mistake, and all the others came to me because I had got the first." But it was the work which counted, more than any success that crowned it, and certainly far more than any applause that followed it. His only care had been to till to the best of his ability the small field of medicine in which destiny had placed him, and in so doing to earn the esteem and regard, possibly even the affection, of his colleagues. In this latter respect he could not help feeling, in view of that occasion, that he had in some measure succeeded. He realized at the same time that he had not been as patient and tolerant as, now that the years had taught him philosophy, he would have desired. He had learned that even in laryngology and rhinology God fulfilled Himself in many ways. Endeavours always came short of desires, and therefore the presentation humbled him, but at the same time it filled him with gratitude to all who had conceived it and carried it through.

ASTHMA RESEARCH

Three main lines of work have been followed since the Asthma Research Council published its report a little over a year ago—namely, (1) a study of the possible causes of the disease ; (2) investigation into the reaction of the bronchi in so far as they throw a light on the causes ; (3) direct search for efficacious treatment. The present report[1] covers the period up to the end of last month, and gives an account of attempts which have been made to extract reliable information from a tangle of difficulties. At the Guy's Hospital Clinic records of 400 asthmatics are being analysed in respect of blood pressure, pulmonary damage, and response to treatment. Generally speaking, autogenous urinary proteose, autogenous vaccines, specific desensitization, and vaccines of Friedländer's and allied bacilli have given palliative results rather than complete success, and relapses have been frequent on cessation of treatment. Further study on the urinary proteose of the asthmatic has succeeded in showing that this substance can be broken down into something of simpler composition than protein. Examination of sputum obtained during attacks has given some guidance as to the need for, and success likely to be derived from, vaccine treatment, while it has also helped in indicating the type of case which shows definite allergic reactions in the bronchi. Routine skin-testing has also provided interesting information. There is often difficulty in deciding whether an apparently positive reaction is truly allergic or merely toxic. Evidence suggests that all truly allergic manifestations are accompanied by a local concentration of eosinophils, and it seems probable that this is also true of the skin reactions. A larger series of cases is being examined with a view to a possible application of this in routine testing. At the Hospital for Sick Children, Great Ormond Street, particular attention has been paid to the problem of diet. This question has been studied with the object of discovering: (1) the optimum proportions of protein, fat, and carbohydrate which will benefit the asthmatic state ; (2) whether an abundance of vitamins would be of advantage. The majority of good results were obtained with a high fat diet. Children who did well on any diet were not those hypersensitive to foods, and they had more or less normal gastric acidity ; those who did not do so well had deficiency in gastric juices and hypersensitivity to certain foods. It is possible that the inclusion of wheat, eggs, milk, or bacon in the diet explained the failure in those children who showed no benefit on any diet. In groups receiving additional vitamins there appeared to be no increased freedom from attacks of asthma. Other conclusions arrived at in the clinic are that specific desensitization is the most reliable weapon for cases resisting medicinal treatment, non-specific methods being inconsistent in result, and that grass pollen is practically the sole cause of seasonal hay fever in this country. At St. Mary's Hospital, as in previous years, desensitization by autogenous or stock vaccine has been the chief routine measure. Work has also been proceeding on the urinary proteose and upon a carbohydrate moiety derived from grass pollen. A polysaccharide—apparently similar to that split off from corresponding bacterial substances—has been obtained, which, however, gives no specific reaction on hay fever subjects. As regards alleged specificity to grass pollens eight different types of grass have been used. It is concluded that if any patient reacts to any one of these (that is, if he is a true hay fever subject) he will react in true proportion to all the others as well. Conversely, if he does not react to one of these pollens he will not react to any of them (that is, he is not a hay fever subject). Complete desensitizations have been made by using grass pollen vaccine—one of two pollens. Whenever adequate dosage has been given loss of skin reaction to all test grasses has followed, and the result is that a "cure" may be promised during the hay fever season involving complete abolition of skin reactions and complete absence of clinical symptoms. Other problems studied have been that of sweat in asthma, the psychological factor, local anaphylaxy, and the serum factor in sensitization. At King's College physiology department research has been concerned with eosinophilia. Urea administration causes a rise in the eosinophil cells, both in the eosinophilia of asthma and in that of anaphylaxis, a fact which supports the view that many cases of hypersensitivity may be examples of true anaphylaxis. Work has been continued on the fundamental reactions of the bronchi in order to discover to what extent the bronchial muscle differs from other muscles. Calcium, for example, has a profound influence on the power of contraction of the bronchial muscle, and it is possible to desensitize a hypersensitive bronchial muscle, without bronchospasm, by the use of adrenaline with large doses of foreign protein and by reducing the amount of calcium supplied to the bronchi. This hints at the possibility of treating anaphylactic asthma by a single injection instead of by multiple doses. Adrenaline still appears to be the most valuable broncho-dilator, and further experiments on the exact dosage of histamine and adrenaline necessary to counteract each other have had the object of making it possible clinically to stimulate the natural secretion of adrenaline and so prevent broncho-constriction. At the Leeds General

[1] Asthma Research Council. Report of Progress for the Year ended October 31st, 1932. Copies of the report can be obtained gratis from the Secretary, c.o. King's College Hospital, Strand, W.C.2.

Infirmary treatment has included intravenous injections of peptone and the use of vaccines, and specific desensitization by oral administration and by injection. Study of the changes in the red cell count has shown that after a serious attack of asthma the red cells of the blood become more numerous, while during intervals of freedom from attacks the count tends to fall. Administration of fresh liver or liver extract has given encouraging results in some cases.

ROYAL SOCIETY AWARDS

The King has approved the award by the President and Council of the Royal Society of Royal Medals to Professor Edward Mellanby, M.D., F.R.S., for his work on dietary factors, especially in connexion with rickets, and to Professor Robert Robinson, F.R.S., of the University of Oxford for his work in organic chemistry. Professor Mellanby, whose Centenary Meeting paper on the clinical application of recent work on bone disease appears in our opening pages this week, has held the chair of pharmacology in the University of Sheffield since 1921 ; the British Medical Association awarded him the Stewart prize for epidemiological research in 1924, and he gave the Hastings Popular Lecture on " Diet and health " in 1931. Other medals awarded by the President and Council of the Royal Society include the Darwin medal to Dr. C. E. Correns for his researches in genetics, and the Buchanan medal to Professor Th. Madsen of Denmark for his theoretical and practical work on immunity, especially in relation to diphtheria antitoxin. Professor Madsen is president of the Commission on the Standardization of Biological and Serological Products appointed by the Health Organization of the League of Nations, and director of the State Serum Institute, Copenhagen. At the anniversary meeting on St. Andrew's Day, November 30th, Sir Frederick Gowland Hopkins will be recommended for re-election as President of the Royal Society and Sir Henry Dale as joint secretary, while those recommended for election to the Council include Dr. J. A. Arkwright, Professor A. V. Hill, Professor E. Mellanby, and Mr. Wilfred Trotter.

THE MATHEMATICS OF HUMAN OUTPUT

A recent monograph by Dr. S. J. F. Philpott, entitled *Fluctuations in Human Output*[1] records an investigation of uninterrupted mental work in subjects who were mostly groups of school children and adult students. The tasks chosen were of a standard type, such as putting dots in successive squares of squared paper, adding columns of figures in pairs, performing simple subtractions, etc. The subjects of experiment were asked to work at high speed and mark their work at five-second intervals in response to a time signal. On plotting out the voluminous material obtained, and subjecting it to an elaborate analysis, it appeared that the output underwent periodic fluctuations, the waves of relatively good and bad output being of geometric duration. For instance, four boys working on the dotting test showed dominant crests of output after about 45, 90, 180, and 360 seconds of work. These times are in geometric progression, with an increasing ratio of 2.0. The ratios observed varied in different instances from 1.5 to 2.5, and the curves had individual peculiarities in different subjects and with different tasks. Geometrically distributed waves could, however, be traced almost without exception. The ratios varied from time to time in the same persons, apparently irrespective of fatigue, and it was impossible to predict what they would be. The author concludes that no mechanism, physiological or psychological, can cover his results, taken as a whole. The cycles usually mentioned when discussing fluctuations, such as pulse and respiration, are of arithmetic periods and thus can scarcely be concerned. Sensitive mechanisms appear to exist which are of a different kind altogether from those of simple cell mechanics, of drainage, or the like. The waves may be due to complex molecular changes, but for the present their nature is a mystery.

[1] *Brit. Journ. Psychol.* Monograph Supplements, vol. vi, No. 17. 1932. London: Cambridge University Press. (12s. 6d. net.)

DEATH OF DR. BABINSKI

The death of Joseph François Félix Babinski in his seventy-fifth year, on October 29th, has evoked many memories of a distinguished past which reaches back to the days of Charcot. Babinski's international reputation as a neurologist depended on much conscientious as well as successful work ; and although to the average student of medicine his name has been familiar for generations in connexion only with the sign bearing his name, his contributions to clinical medicine and pathology were far-reaching and varied. He had justly been described as one of the makers of modern neurology. As one of Charcot's pupils, much of his work was inspired by this teacher, and it was as a chief of a service for diseases of the nervous system at the Salpêtrière, to which he was appointed in 1885, that he made some of his most important contributions to medicine. Before this appointment he had, however, made very thorough anatomical and pathological studies. His researches into the nature of hysteria led him to define a psychic condition amenable to persuasion, to be known henceforth by the term he coined, " pithiatism." The big toe reflex known by his name had already been observed by Vulpian, but its methodical interpretation in connexion with disease of the central nervous system was to the credit of Babinski. Other conditions whose mechanism and significance he helped to explain were pupil reflexes in the early stages of syphilis of the nervous system, vertigo due to ear disease, aneurysm of the aorta, and lesions of the cerebellum. His clinical experience and acumen as a consultant were drawn on extensively by his colleagues.

The Thomas Vicary Lecture will be delivered in the theatre of the Royal College of Surgeons of England, Lincoln's Inn Fields, on Tuesday, November 15th, at 5 p.m., by Mr. Francis Weston, F.S.A. His subject is " The London Guild of Barbers (formerly Barber Chirurgeons) and Thomas Vicary—Serjeant Surgeon to Henry VIII—as Master thereof."

The next quarterly meeting of the Royal Medico-Psychological Association will be held on Tuesday, November 22nd. Sir Farquhar Buzzard will give the Maudsley Lecture entitled, " Education in Medicine," in the Barnes Hall, 1, Wimpole Street, at 3 p.m.

MEDICAL USES OF RADIUM

MEDICAL RESEARCH COUNCIL'S REPORT

The annual report of the Medical Research Council upon the medical uses of radium[1] has just been issued, and forms the tenth of the series dealing with this particular subject. A small document of some thirty pages—excluding the appendices—it nevertheless gives a concise summary of the research and clinical work done at the various centres in association with the Council during the year 1931. Striking indeed is the increase in the use of radiation for the treatment of cancer. The accompanying table compiled from the records of ten institutions, no one of which "specializes" in radium treatment, shows this very clearly.

	Number Treated (1931)	Percentage of Number Treated
By all methods	2,333	100.0
„ surgery alone...	758	32.5
„ radium alone...	761	32.6
„ *x* rays alone	255	10.9
„ surgery + radium	225	9.6
„ surgery + *x* rays	181	7.8
„ radium + *x* rays	119	5.1
„ surgery + radium + *x* rays ...	34	1.5

Fewer cases were treated by surgery alone than by radium alone, while radiation treatment of some kind entered into the therapeutic measures adopted in no less than 67.5 per cent. of all cases quoted.

At present clinical interest would appear to centre round three groups of cases especially—neoplasms of the mouth, breast, and cervix uteri. In the first of these groups, cancer of the tongue with glandular metastases is still the most difficult problem, and in spite of all that has been done the expectation of life for such a sufferer is but small. Nevertheless, the present position is that excision of the tongue, with its attendant mutilation, has given place to treatment by radium; and radiation therapy, even when able to do nothing else, can often make the surviving space of life much more tolerable for the patient. As regards mammary carcinoma, the method of Keynes, with such modifications as individual cases demand or individual operators deem advantageous, still holds the field. For cancer of the cervix uteri the radiological method most favoured consists in the local application of radium to the cervix and fornices, followed at a later date by *x* rays or gamma radiation applied externally.

RADON

It is gratifying to learn that the Radium Commission has placed a gram of radium at the disposal of the Medical Research Council for experimental purposes, and that systematic research upon the fundamental chemical and physiological actions of radiations will be thereby facilitated. Such work is of the highest value in furthering the scientific application of radiations to the treatment of disease; without knowledge of these fundamental reactions radium therapy must remain purely empirical. Since 1925 the Medical Research Council, with the support of the British Empire Cancer Campaign, has had a radon centre housed at the Middlesex Hospital. In spite of the fact that two of the great London hospitals—the London and St. Bartholomew's—have now radon centres of their own, the demand for the supply of radium emanation at the Council's centre has continued to grow. It is indeed hard to estimate how urgent a public need, as regards research work, is filled by this radon centre. Radium emanation (or "radon") is for many purposes an ideal source of radiation for research work. Owing to the rapid decay of radon it is perhaps impossible to obtain exactly the same conditions for clinical work as with radium itself; nevertheless, for a great deal of treatment—especially that which is at present in a more or less experimental stage—it offers great advantages. For instance, it allows of wide latitude in the content of individual sources of radiation, and the applicators can be made of any special size or shape to meet individual requirements. For experimental work upon animals it is of special service, not only for the reasons just specified, but also because—apart from the value of the container—it has practically no intrinsic value. For experimental work of a chemical character it possesses the marked advantage that practically any desired screenage can be used, so that the amount of beta radiation allowed to pass can be varied at will. Since beta and gamma radiations differ rather in the intensity than in the nature of the effects they produce, the study of phenomena produced by the more active beta radiations often offers a clue or a suggestion for the elucidation of problems connected with the action of the gamma and *x* rays.

BIOLOGICAL EFFECTS OF RADIATIONS

The Strangeways Research Laboratory at Cambridge is continuing its work on the effects of gamma radiation upon mitosis; from which it would appear that temporary inhibition of mitosis is, when the damage inflicted is not too great, followed by a compensatory increase. The same laboratory also reports upon the action of penetrating radiations on tissue metabolism. At the Lister Institute investigations are in progress on the effects of gamma rays upon the flagellate protozoon *Bodo caudatus*. Cultures of the organism show a diminution of growth when grown in the presence of radium, and there are differences in the appearance of survivors from the irradiated strain. These changes persist after the removal of the radium for a number of generations, but eventually disappear. Dr. Mottram, continuing his researches upon the disappearance of the lymphocytes from the peripheral circulation under the influence of gamma and *x* rays, attributes the phenomenon to an accumulation of these cells in the irradiated capillaries. In collaboration with Dr. Eidinow he has also investigated the effects of divided doses of radiation, and found that while splitting the dose produces a reduction in the effect on the skin, it does not have this result upon the effects of irradiation on tumours. Miss Goulston reports upon investigations dealing with the effects of radiation on the chorio-allantoic membrane of the chick embryo. The work was undertaken to investigate the claims advanced by Moppett that marked differential action by radiations of different wave-lengths occurs with this structure. In addition to normal processes of growth and regression, which occur in this as in other temporary organs and tissues, the utmost care must be taken to avoid changes due to trauma and to bacterial contamination. Another piece of work by Dr. Mottram is of importance from its bearing upon the effects of radiation in the neighbourhood of bone; he found marked degenerative changes in the muscle of the rat when bone was present in the irradiated area. The degenerative changes were more marked in muscle close to the bone than in similar tissue which was nearer to the source of radiation but remote from bone. The result is attributed to the action of secondary radiations given off by the calcium in the bone.

[1] Uses of Radium. Special Report Series, No. 174. H.M. Stationery Office. (1s. 3d. net.)

Other Research

Of very great interest is the report of a case from the Royal Free Hospital, where a needle containing 2 mg. of radium element, with 0.5 mm. platinum screenage, was displaced after an operation for breast cancer. The needle penetrated the thoracic wall, and finally lodged in the heart, where it remained for about three years. Marked local changes of a necrotic character were present in the heart muscle, and were associated with degenerative changes in the blood vessels. In addition to other pathological abnormalities, the liver was found to be enlarged and very much deformed. There was a large haemorrhagic tumour in that part of the organ immediately subjacent to the needle, and histologically this proved to be a haemangio-endothelioma. Metastases were present in the lungs and bone marrow. The situation in the primary growth indicated that the radium, directly or indirectly, was responsible for it. It may be added that the original site of the mammary carcinoma showed only dense scar tissue, and there was no evidence of secondary deposits of mammary cancer elsewhere. So far as we are aware, the case is unique, and of outstanding interest as showing the production of a malignant tumour from a relatively small source of gamma radiation acting over a prolonged period.

From the Barnato-Joel Laboratories of the Middlesex Hospital come reports of work done to estimate the intensity and distribution of radiation when applied interstitially or superficially to the head or neck. This was done by means of life-size models. One of these is a model showing an antero-posterior mesial section through the head and neck. The other model is built up of a series of superimposed slabs of wax about 1 cm. thick. Upon the upper and lower surface of each section is a photograph showing the structures seen in a cross-section of the head at that plane. Photographic films inserted between the sections where the effects of external dosage are in question afford a means of estimating the amount of radiation received. The relative opacity of the film from point to point is estimated by its power of absorbing white light, which is registered by a photo-sensitive selenium cell and galvanometer.

The first appendix contains a detailed and tabulated statistical summary of cases treated with radium at the Middlesex Hospital since 1925. It is obviously impossible to give an adequate account of the contents of such a report, which itself is almost condensed to the utmost, in the space at our disposal. This is, however, the less to be regretted as the low price of the booklet places it at the disposal of all who are interested in the subject.

Ireland

Public Health in the Irish Free State

The annual report for 1930–1 of the Department of Local Government and Public Health in the Irish Free State[1] reveals a welcome decline in the mortality returns, the total number of deaths (41,702) being the lowest yet recorded, and representing a rate of 14.16 per 1,000 of the population. Compared with the previous year, the chief decrease occurred in the deaths from influenza, and, in consequence, the mortality attributable to pneumonia, bronchitis, and other diseases of the respiratory tract was also lighter. Lower returns appear also in respect of enteric fever, scarlet fever, whooping-cough, tuberculosis, diarrhoea and enteritis, and cirrhosis of the liver. There was, however, an upward tendency in the figures for heart disease, cancer, diphtheria, measles, encephalitis lethargica, cerebral haemorrhage, appendicitis, and puerperal diseases. The decreased mortality was apparent in both urban and rural areas, but the improvement in the urban districts was much greater than in the rest of the country. The highest death rates were noted in Cork, Limerick, and Dublin (county boroughs), the lowest in Mayo, Galway, and Roscommon (counties). With respect to typhus it is remarked that the discovery that the louse transmitted this infection proved useful in preventing the spread of the disease, but has failed to explain its repeated recurrence in circumscribed areas after a lapse of years, or its sudden appearance in Dublin and in other localities far from the districts in which it is endemic, and where no connexion with previous cases could be traced. It is added: "The dictum, 'no louse, no typhus,' has not been accepted in this country, and epidemiologists have continued to seek other possible means of conveyance of this virus." In spite of the encouraging decline in the death rate from this cause in the year under review, the reported outbreaks were more numerous and widespread than before, the total number of cases reaching forty-eight, as compared with twelve in the previous twelve months, the county of Mayo being concerned in more than half of the cases. Mobile disinfecting apparatus has been provided for use in districts in which the disease is endemic. In recent years diphtheria has shown increased virulence, and in 1930–1 the number of deaths due to it was 386—an increase of eighty-two on the figures of the year before. Immunization campaigns were conducted in several counties, the preparation used being toxin-antitoxin; good results ensued, as estimated by the comparison of the incidence in these areas and in others where no such steps were taken. Radium emanation is supplied at a nominal charge to medical practitioners throughout the Free State who can satisfy the Irish Radium Committee that they are in a position to use it scientifically for treatment and research, and to submit adequate reports of their results to that committee. During the year 14,730 millicuries were so issued, the largest quantity ever sent out, and not far from the maximum obtainable from the stock of radium in possession of the Royal Dublin Society. The total puerperal death rate was 4.77 per 1,000 live births—an increase over the preceding year of 0.67, the rural and smaller urban districts being largely responsible for this. The explanation put forward is that in such districts there is difficulty in obtaining skilled aid promptly, owing to the distances to be covered and the lack of facilities for communication. The improvements so far effected in urban areas have not yet been paralleled in rural areas. Maternity and child welfare schemes are developing well, and very satisfactory progress has been made in the arrangements for medical inspection and treatment of school children.

[1] Government Publications Sale Office, 5, Nassau Street, Dublin. (2s. 6d. net.)

Mental Treatment

The committee of governors of Massereene Hospital, at their meeting on September 29th, strongly protested against Section 21 of the Mental Treatment Act, which states that when any persons are suspected of being of unsound mind they should be removed to the infirmary or district hospital of the union in which they are resident, and should be examined by the medical officer; if they are certified as of unsound mind the relieving officer of the district should take proceedings to have them admitted to a mental hospital. An explanatory letter from the Ministry, which was read at the meeting, points out that the provision was inserted as an amendment to the original Bill to meet representations which were made during the

committee stage. There was no reason to apprehend that in actual practice it would have the undesirable effect which the committee feared. It was designed to meet exceptional cases, and the number of unhappy persons who were likely to be affected would be few. Moreover, any such patients would be accompanied by police, and, if necessary, when being certified on arrival at the district hospital the provisions of the Act governing urgency cases could be utilized, thus enabling the patient to be removed forthwith to the mental hospital and obviating the necessity for further detention in the district hospital. The clerk said it was a great pity that this amendment had been moved in the House of Commons, since it was apparently not the Government's intention to have such a clause inserted. It was a monstrous proposition. The Government should have some method by which a person could be taken direct to the mental hospital. It was unanimously decided to protest again.

Tuberculosis Treatment in Northern Ireland

In his report for 1931, Dr. P. S. Walker, medical superintendent of the Belfast Municipal Sanatorium, referring to tuberculosis, states that the type of case admitted shows no sign of improvement and that in the majority of cases the general trend is downward. In his opinion the chaos surrounding the subject of tuberculosis is due to the fact that patients are in an advanced stage of disease when first seen. A panic then arises to be actually doing something, and colonies for consumptives and organizations for vocational training, after-care, etc., are set up. In this way attempts are made to cure consumption which is absolutely and definitely incurable, and tuberculosis, which is eminently curable, is ignored. He reminds those not conversant with post-mortem pathology that practically 100 per cent. of individuals dying from any cause show definite evidence of healed tuberculous disease. Dr. Walker discusses the question of climate; he says that the climate of Whiteabbey has been stated recently to be unsuitable. Too much is made of climate; no climate will cure tuberculosis. After a very thorough investigation of this question he is compelled to reiterate his previous assertion that tuberculous patients should be treated in the climatic conditions that obtain where they are permanently resident; the minimum of artificial elements should be introduced. This is not a claim that a Belfast patient will progress as well in Belfast as in Switzerland, but if he has to return to Belfast to follow his vocation or employment his ultimate history will not be more favourable than that of the patient treated in his own environment.

Free Milk for Poor Children

The scheme of the Free State Government to supply free milk to poor people in receipt of outdoor relief came into operation on November 1st. The Government, as already announced, has allocated £100,000 to meet the cost of the scheme, and it is stated that of this sum £27,000 will come to Dublin for distribution by the Dublin Board of Assistance. The advantages which will accrue from this milk scheme are at once apparent. The food voucher now issued is stated to be insufficient in value to purchase the quantity of milk required by growing children. From November 1st babies in the Dublin slums and throughout the State generally, where necessary, will be given milk that is clean and wholesome. Councils are preparing to start distribution of milk, and in Dublin it is learnt that the Board of Assistance has accepted an offer from the Infant Aid Society to administer the scheme. Milk depots will be opened up in areas where poverty and sickness are prevalent, and mothers who have been given vouchers will present them at these depots, receiving in exchange daily supplies of milk. It is estimated that each child considered to be within the scope of the plan will receive milk to the value of 8s. per month. The Infant Aid Society will issue the vouchers on the recommendation of the Dublin Union authorities. Tenders for milk supplies will not be considered unless the Assistance Board is satisfied that Grade A tuberculin-tested milk will be supplied by the vendors. This important provision will ensure that growing children are safeguarded against contracting disease from impure milk, and is a first step towards the official recognition of specified milk grades.

Scotland

Maternal Morbidity in Scotland

By the middle of next month a questionary, designed to obtain information in regard to maternal morbidity as distinct from maternal mortality in Scotland, will be available for members of the medical profession who attend maternity cases. A letter, which has been issued by the Scottish Medical Secretary of the British Medical Association to honorary secretaries of Divisions in Scotland explaining the scope and objects of this inquiry, will be found in the *Supplement* this week at page 245. This inquiry is being carried out because it was found that the information available in regard to maternal mortality was incomplete without wider information concerning maternal morbidity generally. The matter has for some months been under consideration by the medical advisers of the Department of Health for Scotland, the Scientific Advisory Committee of the Department, and a subcommittee of representatives from the obstetrical and gynaecological departments of Scottish universities, and from the Central Midwives Board for Scotland. The Scottish Committee of the Association was approached by the Department of Health and assisted in the adjustment of the questionary. The latter will be distributed by medical officers of health in their various localities to doctors, midwives, and maternity institutions, along with an explanatory letter, and it is hoped by the Scottish Committee of the B.M.A. that the medical profession in Scotland will heartily co-operate in obtaining the desired information. The work will be entirely voluntary, and those practitioners who co-operate will fill up a copy of the questionary in regard to each case treated and return it in a franked envelope to the medical officer of health of their local authority. An important point in connexion with this inquiry is that the information obtained will be entirely confidential, and this will be secured by the fact that in each case the name of the woman regarding whom the return is made will not be given, and the statement need not be signed by the medical attendant, while all forms will be destroyed immediately after the information given on them has been summarized. The form includes thirteen questions, to which very brief answers are required.

Edinburgh Branch, B.M.A.

On November 1st the Edinburgh Branch of the British Medical Association held a dance in the Scottish House of the Association, 7, Drumsheugh Gardens, Edinburgh. This was attended by some 150 members of the Association and their friends, and proved a most successful social entertainment. On Friday, November 25th, a concert will be given in the Scottish House of the Association by the Edinburgh Medical Missionary Choir with orchestra, conducted by Dr. G. Keppie Paterson. The concert will begin at 8 p.m., and tickets may be obtained free on application to Dr. R. W. Craig, Scottish Medical Secretary, 7, Drumsheugh Gardens, Edinburgh. During the evening Dr. C. E. Douglas, chairman of the B.M.A. Charities Committee, will address the meeting on the

subject of the Association's charities, and a collection will be made in aid of them. Dr. Keppie Paterson, who is an ex-president of the Edinburgh Branch, has presented a grand piano to the Scottish House of the Association, and the presentation will take place at this concert.

Notification of Measles and Whooping-cough

The Public Health Committee of the Edinburgh Town Council has decided that in future the system of voluntary notification in cases of measles and whooping-cough, under the Edinburgh local authority, shall apply only to children under 5 years of age, and to the first case of either of these diseases in each house. The usual fee of 2s. 6d. in respect of notification of patients from private practice and 1s. for institutional notification will apply as before. Facilities for hospital treatment will be reserved primarily for notified cases and for adults and older children in whom serious complications have occurred, or whose home conditions are unsatisfactory.

England and Wales

Joint Tuberculosis Council

At the October meeting of the Joint Tuberculosis Council Dr. Brand announced that a successful post-graduate course had been held in Germany during the summer, and had been attended by eleven members of the Tuberculosis Service ; Hamburg, Stettin, and Berlin were visited. A course lasting a week would be held in December at the Brompton Hospital, and promised well. Attention would be directed to the more complex operative procedures as well as to artificial pneumothorax and the use of lipiodol. There was a possibility that some Continental workers might desire to attend a course in this country, in which case the Council was prepared to do all in its power to help them. Dr. Trail reported on behalf of the committee investigating the results of artificial pneumothorax treatment that individual members had gone over the published results, but found no basis for comparison. It had therefore been decided to draw up criteria on which to base a results return in this country, and with that end in view to circularize all institutions asking for their results up to the end of 1932, the returns to be received by the end of 1933. The committee saw no prospect of completing this work before 1934. The Council considered the subject of such importance that it would be much better for the committee to take any time necessary for it to produce something really useful. The members of this committee are Dr. Trail (convener), with Drs. S. Vere Pearson, G. Jessel, W. Brand, D. P. Sutherland, James Watt, C. O. Hawthorne, and Peter Edwards. Further consideration of the report by the committee dealing with the best utilization of tuberculosis institutions was deferred to the next meeting.

Lancashire Census Figures

Statistics relating to the county of Lancaster (H.M. Stationery Office, 6s. 6d.) show that on the night of the 1931 census the total population in the administrative county and its associated county boroughs numbered 5,039,455. In the past intercensal period there has been an increase of 106,504 persons as compared with 171,417 in 1911–21, the corresponding rate of increase being 2.2 per cent.—less than half the national rate (5.5 per cent.), and such as to place Lancashire more than halfway down a list of the counties arranged in order of their rates of growth. The character of the county with respect to urbanization is indicated by the fact that it includes seventeen county boroughs with populations aggregating to 3,244,382 persons and the administrative county comprising nineteen municipal boroughs and eighty urban districts with 1,531,112 population and nineteen rural districts with 263,961 population. The combined urban areas account for 95 per cent. of the population, but 41 per cent. only of the acreage of the county. Liverpool continues to be the largest and most populous area with 855,688 population, and Manchester second with 766,378, these cities ranking, after London and Birmingham, third and fourth largest in the country. The population of Salford is 223,438. The feature claiming, perhaps, most prominent notice is the large and growing number of decreases reported. In nine of the seventeen county boroughs and fifty-four of the ninety-nine municipal boroughs and urban districts the populations have declined since 1921 ; seven of the nineteen rural districts also record a decline. Of the total population in the county 3,337,938 are over the age of 21. Females now outnumber males in almost all the constituencies ; the average female excess for the whole county being 11.4 per cent. in respect of population and 15.8 per cent. in respect of the electorate. The dwellings in the county now number 1,214,858 as compared with 1,064,534 in 1921. Concurrently with the increase of 14.1 per cent. in the number of dwellings the number of private families has grown by 14.6 per cent. The average size of family has been reduced by 11.5 per cent.—from 4.27 in 1921 to 3.78 in 1931. Such fall must be accounted considerable for a peace-time decennium ; it is much greater than in the preceding decennium (5.5 per cent.), during which the population was exceptionally depleted by the loss of men killed on active service. With the reduction in the average size of family, the average unit of occupation has been reduced from 4.43 rooms to 4.39, so that the average number of persons per occupied room in the county has declined from 0.96 in 1921 to 0.86 in 1931. Further evidence of improvement is found in the figures illustrating the relative incidence of excessive room densities. A considerable reduction has been effected in both the numbers and proportions scheduled in the " overcrowded " category. The effect of the distribution of increases and decreases over the whole age period is to raise the average age of the male population from 29.6 in 1921 to 31.6 in 1931, and of the female population from 30.8 to 33.2.

A Dietetic Clinic in Liverpool

In the current issue of the *Liverpool Medico-Chirurgical Journal* (vol. xl, Part 2) Dr. H. S. Pemberton, honorary physician to the David Lewis Northern Hospital, describes a " dietetic clinic," which evolved out of a purely diabetic clinic, and includes patients suffering from arthritis, dyspepsia, hyperpiesia, obesity, hyperthyroidism, pernicious anaemia, renal disease, and nephrosis, as well as of diabetes. The patients are seen at weekly or less frequent intervals, such examinations as basal metabolic rate and blood determinations having been made previously, so that the results shall be available for the dietitian, Dr. Pemberton indicates the value of such an establishment in watching and controlling diabetic patients after they have ceased from intensive treatment in hospital, and indicates the way in which the three main clinical types are dealt with. In the case of other diseases qualitative rather than quantitative dieting is used, standardized dietary prescriptions being imposed. He argues that while knowledge increases about the therapeutic value of food on the positive side (as in hyperchlorhydria), or on the deficiency or negative side (as in certain types of arthritis), or on the side of imbalance (as in diabetes), an organization for applying this therapy, and for seeing that it is enforced, is inevitable. In these conditions, inasmuch as discipline and constant supervision must be necessary in

the taking of such a common substance as food, a clinic seems to be the only medium which will allow of such supervision during the ordinary working life of the patient.

Voluntary Mental Patients in London

During the quarter July to September, 1932, 65 voluntary patients were admitted to the London county mental hospitals, and 38 discharged therefrom, the number remaining in residence being 174 (104 males and 70 females). At Maudsley Hospital during the same period 208 patients were admitted and 100 discharged, the number remaining in residence being 232. In the out-patient department at Maudsley, 1,353 (442 men, 690 women, and 221 children) received treatment during the quarter.

CORRESPONDENCE

Poliomyelitis in a School

SIR,—In view of the recent outbreaks of poliomyelitis, we felt that it might provoke discussion if we placed on record our experience recently at a public school.

On the night of October 9th we saw in consultation a boy, aged 15 years. He had been perfectly well the previous day, and had complained of nothing on going to bed: during the night he had complained of some backache, and by 8.30 next morning he was unable to move. When we saw him there was complete flaccid paralysis of both legs, and loss of control of bladder and rectal sphincters. There was complete anaesthesia to stimulation by heat, cold, pin-prick, cotton-wool, and vibration extending over both legs, the abdomen, and the thorax as far as an inch above the nipples. Temperature 100, respiration 22, pulse 80; disks normal, and no involvement of any cranial nerve. The intellect remained perfectly clear; but there was a slight though noticeable drowsiness, together with a surprising lack of anxiety in view of his condition. Lumbar puncture revealed a fluid which was under increased pressure, but from which no further information could be obtained, apart from culture, owing to it being freely mixed with blood: this added temporarily to our difficulties, as the differential diagnosis appeared to be between transverse myelitis, cerebro-spinal meningitis, or anterior poliomyelitis. The following morning, thirty-six hours after the onset, the picture remained unchanged, except that the anaesthesia had advanced an inch higher and there was rather more drowsiness.

Culture of the cerebro-spinal fluid was sterile; and subsequent lumbar puncture showed the fluid to be still under pressure but practically clear. A definite diagnosis of polio-encephalitis was therefore made, the infection being regarded as a particularly virulent one.

We were then asked to attend a conference with the headmaster and the house-master to decide upon what steps should be taken to safeguard the interests of the school. It will be borne in mind that this conference took place forty-eight hours after the onset of the disease and two hours after the diagnosis had been confirmed. The headmaster put the following questions to us, and we append our answers.

Q.—(1) Ought I to close the school?

A.—No, as there may be either carriers or infected boys in the school, who are at present under control. It appears to us that by shutting the school there would be a very great risk of disseminating the infection over the country and imparting the disease to the boys' smaller brothers and sisters. Further, that the interests of the community must come before those of the school.

Q.—(2) Ought I to isolate the school and the boy's house; and, if so, for how long?

A.—Yes, the school should be isolated as far as possible and all matches with other schools cancelled. The boy's house should be strictly isolated from the rest of the school, owing to the greater risk of their having been infected. The period of isolation should remain in force for fourteen days, which is slightly beyond the ten-day limit; but owing to the virulence of the infection, and the fact that it is in a school, strict precautions are necessary.

Q.—(3) The domestics in the boy's house come from the town: should they remain in residence in the house during the period of isolation?

A.—Yes.

Q.—(4) Can I order other masters, apart from those resident in the boy's house, to help in the teaching of the boys during their isolation, as some of them are married men with small children?

A.—No. The question should be one of volunteering for such service, it having been explained to the masters as a whole that the risk of adult infection was extremely slight.

Q.—(5) What steps do you propose to take to deal with any fresh cases?

A.—We will obtain supplies of anti-poliomyelitic serum which will be ready for immediate use. Any boy showing signs of any minor ailment, however trivial, should be immediately isolated in hospital for strict observation.

Q.—(6) Is it reasonable for any parent to take exception to their boy being under observation in the same hospital as that in which the actual case is being treated?

A.—No, as an entirely different wing should be left for the purpose; and the boy is being treated in a separate side ward with very strict isolation precautions.

Such were the questions that we were called upon to face. It will be appreciated that we had little to guide us; but the answers appeared to us to be the best at the time. In point of fact, at the expiration of the fourteen days no further cases had occurred. We publish these notes on what appears to us to have been a position fraught with difficulties at every turn, and shall welcome criticism.—We are, etc.,

ROY N. CRAIG, M.D., D.P.M.,
Exeter.
GEORGE LOWE, F.R.C.S.,
Tiverton.

November 1st.

Precision in Radium Therapy

SIR,—It is difficult to see with Mr. Fitzwilliams's clearness the close analogy between castor oil and radium; in fact, it is rather those points of difference between these two agents which leap to the eye. The important fact about castor oil is that a certain desired effect is produced in 99 per cent. of cases after its administration in doses which need not be particularly accurate. So that the answer to Mr. Fitzwilliams's question as to whether the result is satisfactory is in the affirmative, and there is little need to weigh the baby or to conjure up a mental picture of the villi in the process of titillation.

But in the case of radium, as Mr. Fitzwilliams will admit, the desired effect is not attained in anything like 99 per cent. of cases, and the lack of uniformity in the results of treatment of even similar types of tumour is likely to be due, at any rate in part, to lack of uniformity in the amount of radiation received by it. So that, although it is not necessary to weigh the baby in the case of castor oil, because the result is a foregone conclusion, it is precisely because the results are by no means so certain in radium therapy that more accurate knowledge about dosage is desirable. There are so many factors in radium therapy which deserve to be labelled "empirical" that it seems to us that use should be made of any attempt to standardize any of those factors.

The equation denoting the value "*I*" quoted in Mr. Mayneord's paper may not have helped Mr. Fitzwilliams—and we must confess that we stumbled even earlier in the paper than this—but those calculations may surely be valuable in leading to more detailed knowledge of what is happening in the tissues, if they can be interpreted to the clinician.

Such work as that of Quimby and Martin and of Stahel and Murdoch has done much to standardize dosage in different ways, and we believe that radium therapy will become more satisfactory as it becomes less empirical, and that the efforts of the clinician are unlikely to achieve much in this direction without the help of the physicist.—We are, etc.,

ROY WARD.
A. J. DURDEN SMITH.

London, W.1, Nov. 7th.

Dressing of Wounds

SIR,—Mr. Paul Bernard Roth's letter (October 29th, p. 816) prompts me to make a few remarks, not only on the treatment of osteomyelitis, but on the treatment and "dressing" of wounds in general. It is probable that in the aggregate more unnecessary suffering is caused by the senseless dressing of wounds than by all the major procedures of surgery. These last are at least mitigated by the appropriate use of anaesthetics and anodynes.

During the war I saw a distinguished surgeon visit a case of guillotine amputation through the leg in an officers' hospital. He decided, for no very obvious reason, that it must be "dressed." Slowly and very painfully a piece of perfectly harmless adherent gauze was dragged from the raw surface of the stump, being moistened from time to time with trickles of lotion and separated by pulling with forceps. Eventually the stump was exposed and a few flakes of yellow lymph showed on its surface. The surgeon took a gauze swab and dabbed at one of these, and the patient winced with pain. The surgeon did this four times, and then he covered the wound with gauze, wool, and bandage. The patient was left to wait in dread for the ordeal of the next "dressing." What purpose was served by this senseless procedure it is impossible to conceive. Yet it is done every day in countless numbers of cases by surgeons, dressers, and nurses.

Few surgeons, and fewer nurses, seem to realize that in the absence of virulent infection (which is easily recognized) the decomposing discharges from a granulating wound, although teeming with saprophytic organisms and stinking, are nevertheless quite harmless on the surface of the body; they are not absorbed to an appreciable extent from an open wound, and they are the best possible culture medium for growing cells.

About twenty-five years ago, when I was a house-surgeon at Guy's, a man came to the hospital with his fingers and hand badly burnt by molten metal. He was given an anaesthetic, and the raw surfaces were carefully cleaned with normal saline solution. They were then completely covered with Thiersch skin grafts taken from his thigh. Each finger and the hand were then dressed with plain sterile gauze wet with saline solution, and the whole hand was enveloped in a voluminous dressing of gauze and wool. The man attended for inspection every day, and, as no signs of virulent infection appeared, the dressing was left undisturbed for three weeks. At the end of that time a stinking mass of foul dressing was peeled off his hand, and the whole of the grafted area was found to have "taken."

Since then I have employed this dressing for all cases of skin grafting and for plastic operations, such as those for webbed fingers, and there is no other dressing that can compare with it. A skin graft is essentially a "plate culture" of epithelial cells upon a raw surface. The conditions required for growth are a suitable culture medium, warmth, moisture, and non-interference—and the greatest of these is non-interference.

During the war I saw many cases of chronic granulating wounds in military hospitals. In such cases I always asked first "How often are you dressing it?" and the reply invariably was "Every day." I then gave instructions that a large dressing of plain gauze and wool should be put on the wound, and that it was not to be touched for three weeks. Almost invariably at the next dressing the wound was found to be healed, or nearly healed, or greatly diminished in size. Many of these wounds were gunshot wounds involving the bones, and they were in all respects similar to those which result from operations for osteomyelitis. I do not pretend that these were got to heal in three weeks, but their progress was rapid in comparison with frequently dressed wounds.

The principle of non-interference is nothing new. John Hunter regarded the pus from a granulating wound not merely as innocuous, but as a "healing fluid." "Healing under a scab" was described in all the older text-books of surgery as a normal process of healing, and it was an essential part of the process that the scab should not be disturbed. The surgeon can greatly facilitate the process in large wounds by providing "the scab" in the form of a large dressing, and by conserving warmth and moisture.

The same principle of non-interference applied to the wounds and cavities of osteomyelitis has recently been described as "the Winnett Orr method of treatment." Its essentials are, first, to free the wound from *virulent* infection, and, secondly, to cover it up and leave it alone. It is not possible to sterilize such a wound nor to keep it sterile. But it is possible to get rid of virulent infection, and the chances of reinfection with virulent organisms thereafter are small. The primary object of non-interference is not to prevent reinfection, as suggested by Mr. Roth, but to prevent busy hands from "pulling up the plant to see how the roots are growing." It does not matter whether the wound is packed with vaseline gauze or with plain sterile or antiseptic gauze, or indeed whether it is packed at all, provided that it is covered up and left alone. Discharges will leak past a *loose* pack of sodden gauze just as easily as past a vaseline pack, and they will find their way out better still if there is no pack at all.

It is true that the smell of decomposing discharges is very offensive, and it is not less offensive in a patient's home than in a hospital or nursing home; the only difference is that it is smelt by a different lot of people. It may interest some of your correspondents to know that a few drops of liq. sodae chlorinatae, *B.P.*, sprinkled over the dressings, or, better still, poured into boiling water and allowed to evaporate, will remove all the smell from a room like magic.

Maggots no doubt will remove much of the dead and putrifying material from a wound. But as this material is not necessarily harmful—and it may be even beneficial—there does not seem to be much point in employing maggots to remove it. Maggots obviously will not grow in a wound that is washed out, cleaned, and dressed every day, and it is essential for the success of "maggot treatment" that the wound should be left undisturbed for relatively long periods. How much of the success is due incidentally to non-interference with the wound and how much, if any, is due to the maggots? I have yet to meet a surgeon who would allow maggots to be put into any wound of his own.—I am, etc.,

London, W.1, Nov. 1st. A. S. BLUNDELL BANKART.

Treatment of Osteomyelitis

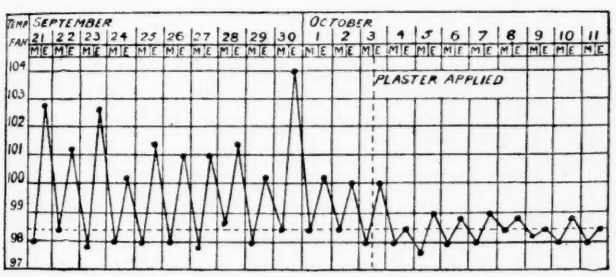
SIR,—I was interested to read Mr. Cecil Wakeley's article (October 22nd) on acute osteomyelitis, and Mr. Paul Bernard Roth's letter (October 29th) on the Orr treatment. I have practised the latter since July, 1929, on all my cases, although not a large number, with consistently good results. Mr. Wakeley's figures show the diminishing frequency of the incidence of acute osteomyelitis, and my impression is that I see definitely fewer cases now than in my student days, although I work at hospitals having large emergency practices. With regard to the odour from the plaster on these patients, this was certainly a real disadvantage, the smell usually heralding the patient to the out-patient consulting room and persisting long after his departure. During the past year, however, I

have almost eliminated this by the use of cyanide gauze soaked in vaseline and liberally smeared on the outside by bipp before applying the plaster. No longer do members of the patient's family beg for it to be changed or the nursing staff resent the method.

The Orr treatment, in addition to preventing secondary infection, as pointed out by Mr. Roth, has a further advantage in that it keeps the limb so warm ; every plaster I have touched in these cases has been definitely warmer than the corresponding limb, and this is a further aid to rapid repair. Another point I have noticed is that in all the cases thus treated the sequestrum has presented itself in the sinus and been easily lifted out with the dressing forceps without pain or bleeding. I have withdrawn the complete diaphysis of the ulna, radius, and metatarsal in this manner, followed by prompt healing. Its efficiency was dramatically shown by one of my recent cases.

A youth of 16 had a gunshot wound in his knee-joint and inner condyle of the femur. The bullet was removed, but he developed a severe suppurative arthritis. This passed on to subacute periosteomyelitis, and tracked into the thigh and calf, in spite of very liberal incisions about the joint and into the muscles, which poured pus. With continuous Carrel-Dakin irrigation and injections of edwinil, aolin, and mercurochrome we were unable to arrest the spread of the sepsis and discharge. The patient was reduced to a physical and mental wreck, being sallow, emaciated, and pale, and whimpering even when his leg was inspected. So ill was he that when my house-surgeon tentatively suggested to the parents that it might be necessary to amputate, they agreed immediately, and asked for it not to be delayed. As Hilton pointed out years ago, a continuous purulent discharge has the same effect as a continuous haemorrhage, and it was rapidly exhausting this normally stout country youth.

I placed rubber glove drains into the wounds, dressed them with cyanide gauze freely smeared externally with bipp, and applied a plaster from the toes to the groin. The temperature chart here shows the result. For two days the toes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PLASTER APPLIED

were cold but not blue, his pain immediately vanished, and he has been quite comfortable, sleeping and eating well since. He has colour in his cheeks again, the sallowness has disappeared, and there is no smell from the plaster.

I regard the treatment of the utmost value in adequately opened abscesses, whitlows, cellulitis, arthritis, and osteomyelitis. It has certainly taught us that wounds of all descriptions do much better when " left alone " than when dressed frequently, often the usual practice.—I am, etc.,

HAROLD DODD,
Surgeon, King George Hospital, Ilford, and Royal Hospital, Richmond.
London, W., Nov. 2nd.

Research in Mental Disease

SIR,—The recent letters from Dr. R. G. Gordon, Dr. C. Davies-Jones, and Dr. Ian Suttie emphasizing the importance of the psychological approach to patients in mental hospitals as the ideal means of research and therapy, as opposed to the test tube and laboratory variety now so popular, will, I am sure, be greeted with joy by all those who like myself are particularly concerned with early and preventive treatment.

Now that it is permissible for patients to be received as " voluntary patients " the field for early and preventive treatment will inevitably be shifted to some extent to the mental hospital. Up to the present there has been practically no opportunity for the permanent staffs of mental hospitals to come in contact with the incipient case of mental disorder ; they have had no opportunity of observing the gradations taking place in the individual from comparative sanity to established psychosis. They have therefore, for the most part, little conception of the processes at work, and when faced with a patient who is apparently inaccessible they are at a loss as to where to find a possible angle of psychological approach. In the far past this resulted in a completely apathetic attitude towards the whole matter, and the greater part of " asylum " medical officers were content to regard their role as little more than custodial.

The move to the laboratory which has been developing during the last twenty to thirty years represents a great advance on this *laissez-faire* attitude, and in so far as it has killed the old disastrous indifference it is a move of the greatest importance and value. It is true that the results of the researches so initiated have been on the whole somewhat barren ; moreover, research to be of established value must be undertaken by experts, and should be organized and controlled much more than has been possible in the isolated pieces of research so far undertaken ; but any criticism should take into account this fact that the laboratory approach represents the first attempt at any sort of approach, and therefore has played a worthy part in the evolution of the prevention and treatment of mental disorder.

What is needed to-day as the next step forward is the establishment of psychological research units in mental hospitals, where one or more doctors would have the entire charge of a very few patients, say four or five, and would live with them in the close proximity that the nurses do, observing every detail of their behaviour and reactions both day and night. These doctors should, of course, be persons who have had previous experience of the early case, such as is possible at the Maudsley or the Lady Chichester Hospital, Hove, for example. Such work cannot possibly be undertaken by medical officers who would have to combine with it routine hospital duties ; they would require to be seconded entirely for such a piece of research. This would of course mean money, but there can be no question that money so used would be infinitely better spent than in the installation of expensive apparatus for hydrotherapy, heliotherapy, radiography, biochemical investigation, and the like, which still appears to be the shibboleth of so many modern mental hospitals.—I am, etc.,

DORIS M. ODLUM,
Physician to the Lady Chichester Hospital for Treatment of Functional Nervous Disorders.
London, W.1, Nov. 5th.

Aluminium and Health

SIR,—Dr. Eric Pritchard's letter in your issue of October 29th on the above subject is both interesting and important. I find myself in considerable sympathy with his arguments and deductions. But surely the question whether food cooked in aluminium utensils ever affects anyone adversely can be settled once and for all by a simple series of experiments.

I was present at the meeting of the Hampstead Division when this subject was discussed at great length, and during this meeting several of those present affirmed that either they themselves or one or more of their patients were so susceptible to the effects of food cooked in aluminium that malaise of a definite and easily recognized

nature occurred immediately after taking food which had been cooked in aluminium vessels. If these practitioners and others will submit themselves to the following simple test this vexed and important question can be solved once and for all.

Let an independent body prepare some article of food sometimes cooked in aluminium and sometimes in other types of cooking dish, and send or give equal quantities of such food over equal periods of time without the recipient knowing by which method it has been cooked. Then all he has to do is to state whether the test dishes produce the symptoms he has attributed in the past to food cooked in aluminium vessels or not. If the factor of correlation is high in a well-controlled series of experiments, then there is "something in it" after all; if it is low, then there is not. I fear it is too much to hope that the Medical Research Council would institute and carry out such a simple practical test.—I am, etc.,

London, W.1, Nov. 2nd. C. B. HEALD.

Prostatectomy

SIR,—The papers on prostatectomy by Mr. J. Swift Joly and Mr. Kenneth M. Walker, which appeared in the *Journal* of July 30th, incidentally containing criticism of my operation, cannot be allowed to pass unchallenged.

The essential features of my operation, which most commentators appear to miss, are briefly these: All bleeding is immediately and positively controlled by suture; the abdominal wound heals generally by first intention; fistula formation does not occur; and there is no post-operative recurrence of obstruction. The results obtainable by this operation, as regards both mortality and morbidity, are in marked contrast to those obtained by the Thomson-Walker technique as described by Mr. Joly and Mr. Walker. The former, after a brief and inaccurate reference to my operation, dismisses it with the words, "the prostatic cavity always becomes infected, and is unsuited for plastic operations." As a matter of actual fact, where my operation more or less completely covers up the raw surfaces, thus guarding them from infection and limiting absorption to the minimum, the Thomson-Walker operation not only leaves the entire prostatic cavity wide open for infection and absorption, but makes it even wider by cutting out a deep "V" from the apex of the trigone, thus exposing to even further infection the most vulnerable portion of the urinary tract. Is it any wonder that septic manifestations are common? This last-mentioned step is undertaken with the object of preventing post-operative recurrence of obstruction. According to the admissions of its sponsors it fails in many cases even to do this. Finally, their persistent post-prostatectomy sepsis, which is featured so largely in the published post-operative results, is sometimes so troublesome that "patients have learnt to wash out their bladders daily with as little difficulty as most of us experience in cleaning our teeth." These evidences of sepsis do not appear when the operation bearing my name is carried out.

The inaccuracy of the references to my operation and the scant courtesy which has been vouchsafed to it are, at this distance, difficult to understand. One would have felt justified in thinking—unless, of course, one's statements were entirely disbelieved—that a welcome would be assured for a method which promised even partial immunity from the appalling list of post-operative sequelae, so frankly acknowledged, and a reduction of the high operative mortality which is stated to be "in the region of 18 per cent. at general hospitals and 8 per cent. at special hospitals."—I am, etc.,

Sydney, Australia, Sept. 26th. S. HARRY HARRIS.

Rheumatic Fever and the Tropics

SIR,—Twenty-five years of varied experience in the Punjab have convinced me that rheumatic fever is practically non-existent among the indigenous population. I cannot remember seeing more than three or four cases during the whole of that period; and they were townspeople and not villagers as Colonel Hughes suggests (October 22nd, p. 773). My work as plague medical officer and civil surgeon has been for the most part amongst the rural population, so I can speak from personal experience. Gonorrhoeal rheumatism is fairly common, and one occasionally sees joint affections in cases of Mediterranean fever, especially on the frontier. If rheumatic fever were at all prevalent surely one would come across cases of mitral disease. This is, however, not the case; I have never seen a case of primary disease of the mitral valve. On the other hand, aortic disease due to syphilis is quite common. During the last four years as civil surgeon of Amritsar I performed some 600 post-mortem examinations for medico-legal purposes, and never came across any evidence of inflammation of the mitral valve, although diseased conditions of the aorta and aortic valves were often seen. (In parenthesis I may state that in India, owing to religious prejudices, compulsory medico-legal post-mortems are practically the only opportunities of performing necropsies.)

As regards dental disease, caries in young people is not at all common. When examining recruits I used to reject them if one tooth was carious, and this was quite rarely a cause for rejection. On the other hand, most adults of 40 and over have pyorrhoea in more or less marked degree. Older people often suffer from chronic rheumatic affections of the fibrositic type, such as stiff and painful joints, lumbago, sciatica, and various forms of neuritis, but true osteo-arthritis I have never seen. I have always believed that the diet of the Punjabi villager, consisting as it does of freshly ground whole-meal wheat flour, pulses, milk, and ghi with fresh vegetables, renders him immune to a great many diseases which are common in this country, such as dental caries, appendicitis, and carcinoma. I make this digression because it seems to me that in the elucidation of the causes of these and other diseases a broader view should be taken and their incidence in non-European races be inquired into, to see what bearing, if any, climate, diet, and customs have upon them.—I am, etc.,

H. C. KEATES,
London, S.W.16, Nov. 4th. Lieut.-Col. I.M.S. (ret.).

Thyroideum Siccum

SIR,—On page 864 of your issue of November 5th there appears a note from Dr. H. A. Mitchell of Evans' Biological Institute concerning thyroideum siccum (*B.P. 1932*). The point raised by Dr. Mitchell has already been brought to my notice by private communications from himself and from other manufacturers.

A reinvestigation of the matter in my laboratory has confirmed the statement of Dr. Mitchell that in the case of thyroid gland dried at a low temperature a large proportion of the organic iodine may be soluble in water. The statement to the contrary which appeared in my original paper on the subject (*Quart. Journ. Pharm. and Pharmacol.*, 1929, ii, 501) was based on the examination of eight commercial samples of desiccated thyroid supposedly prepared in accordance with the requirements of the *B.P. 1914*—that is, by drying at a temperature of 30° to 40° C. By an unfortunate coincidence, as it now seems, not one of these samples yielded more than a very small fraction of the iodine to aqueous extraction, and it was therefore concluded that water-insolubility of the organic iodine

was a general characteristic of preparations of desiccated thyroid.

A further communication on this subject will appear shortly in the *Quarterly Journal of Pharmacy*. I should like to point out here, however, that our knowledge of the thyroid secretion gives no support to the suggestion contained in Dr. Mitchell's letter that desiccation of thyroid at specially low temperatures is particularly advantageous from the therapeutic point of view. The therapeutic activity of orally administered thyroid depends on the liberation of the active principle from the thyroid protein in a form in which it can be absorbed. Denaturation in itself, therefore, is likely to be favourable, owing to its effect in increasing the digestibility of the protein; on the other hand, the restrictions laid down in the *B.P. 1932* ensure that the denaturation necessary for compliance with the water-soluble iodine limit shall be accomplished under such mild conditions that no destruction of the active principle need be feared.—I am, etc.,

C. R. HARINGTON.

University College Hospital Medical School,
Nov. 7th.

Obituary

A. BOSTOCK HILL, M.D., M.Sc., D.P.H.

Emeritus Professor of Hygiene and Public Health, University of Birmingham

Professor Alfred Bostock Hill was for many years a leading authority upon public health, and his loss will be deplored by a very wide circle of friends and admirers, for no one in the Public Health Service was more esteemed. He died at Weybridge, Surrey, on November 4th, in his seventy-ninth year.

His father, the late Dr. Alfred Hill, was for many years the medical officer of health for the city of Birmingham. His first appointment was as public analyst to the county of Warwick, and later he became professor of chemistry at Queen's College, Birmingham. He soon embarked upon public health work, and at the time of his death he was emeritus professor of hygiene and public health in the University of Birmingham, consulting county medical officer of health for Warwickshire, the president of the Central Council for Health Education, a member of the executive committee of the British Social Hygiene Council, and was an active member in directing the work of several other voluntary organizations. He filled many positions of distinction. He was made president of the Society of Medical Officers of Health in 1911–12, president of the Association of County Medical Officers of Health from 1917 to 1924, chairman of the council of the Royal Sanitary Institute, etc. Few could approach him in his knowledge and experience of public health matters, and no one could discuss these more instructively and impressively. Indeed, his clear and practical mind, fully efficient to the end, found expression in speech rather than in writing. He once confessed to the writer that he found literary work to be uncongenial. Certainly he was at his best at public discussions and in committees, and in the public health administrative work, in which he displayed a great and pioneer ability.

Bostock Hill ranked high in the esteem of his colleagues, for all were impressed by his unselfish devotion to his subject, his great integrity, his earnestness; and everyone realized that he had deservedly earned a high place among the most active and prominent leaders of public health thought and endeavour of his day. These facts impressed his colleagues, and lent great weight to his advice and opinions. But beyond—and perhaps above—the general appreciation of his exceptional intellectual powers there were the esteem, admiration, and affection inspired by his kind, genial, and generous nature—his evident desire to be helpful and friendly. All will bow their heads in reverent admiration of one who must rank as among the greatest of British workers in the cause of the health of the masses. He never retired from active service, and even to the very end he begrudged none of his well-earned leisure to the many voluntary public health agencies which he assisted to such a valuable degree. He was for many years a member of the British Medical Association, and was a member of the Ministry of Health Committee of the Association in 1919–20 and of the Insurance Acts Committee for 1919–21. He was one of the members appointed by the Minister of Health in 1920 to form the first General Council of Nursing under the Nurses' Registration Act of 1919.

A colleague writes: As on so many occasions of public health congresses, conferences, and public meetings Bostock Hill had his devoted wife by his side, a large proportion of his many friends and associates have the pleasure of a personal acquaintanceship with her. Every one of these will join in sympathy—to her more especially, but also to the members of her family. There is some solace to their grief in the reflection that he was spared to them for far beyond the average span of human life: as also in the fact that the fruits of his beneficent public services in the cause of the public health, and the fine example he set to those who will follow on, will survive him for many years to come.

LAWRIE HUGH McGAVIN, C.B.E., F.R.C.S.

We regret to announce the death of Mr. Lawrie McGavin, which occurred on October 31st at Folkestone in the sixty-fourth year of his age.

Lawrie Hugh McGavin was educated at Fettes, Heidelberg, and Sandhurst. He was gazetted to the 6th Dragoon Guards in 1888, but in 1893 he relinquished his military career and entered Guy's Hospital, becoming F.R.C.S.Eng. in 1890. In addition to filling the usual resident posts, he was appointed surgical registrar to Guy's Hospital, subsequently becoming surgeon (and later consulting surgeon) to the Women's Hospital, Soho, and the Seamen's Hospital, Greenwich. During the great war his ardent desire to serve abroad was frustrated by reason of ill-health, but he worked incessantly at a number of hospitals in London, notably the Endsleigh Hospital for Officers. He also became a member of the Final Appeal Board of Assessors. For these services he received the decoration of C.B.E. So generously had he spent himself during the years of war that, ill-health continuing, he decided to retire from active consulting work in 1919.

A colleague writes:

As a surgeon Mr. McGavin was safe and sound. He was an admirable teacher of clinical surgery, and his pioneer work on filligree implantation for hernia, and the use of stovaine by intrathecal injection, will be long remembered. As a man, McGavin had the directness of his early military training. This was combined with singular charm. His residents and patients became his life-long friends, and the loss of such a gallant gentleman will be deeply deplored by them. His zest for life was maintained courageously to the end, and, shortly before he died, he had the satisfaction of knowing that the novel that he had written (*The King's Jester*) was a great success. To his wife and three daughters the deep sympathy of many friends is extended.

We regret to record the death, on October 3rd, at Brockham Green, of Dr. JOHN MILLS THORNE. He was 70 years old. Educated at Westminster, he entered Guy's Hospital in 1883, qualifying M.R.C.S., L.R.C.P. in 1890. He was subsequently appointed resident medical officer to

the Royal Hospital for Women and Children, Waterloo Bridge Road. For some years he was in practice at Retford, Notts, where he was surgeon to the local hospital. In 1904 he went into partnership with Dr. C. F. Wakefield at Brockham Green, where he spent the rest of his life. Dr. Thorne was a member of the British Medical Association, and took an active part in various local societies and associations. His loss will be widely felt in the neighbourhood where he resided for twenty-eight years.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a congregation held on November 5th the following medical degrees were conferred:

M.D.—M. C. Andrews, J. H. B. Martin.
M.B., B.CHIR.—J. F. Varley.
M.B.—D. B. Cater.
B.CHIR.—*J. W. Bromley, J. O. Poynton, O. S. Tubbs.
* By proxy.

UNIVERSITY OF LONDON

Sir Charles Sherrington will not deliver the second lecture of his course on "Reflex action" until next term, on a date to be announced later.

The degree of D.Sc. in chemistry has been awarded to Professor E. C. Dodds, M.D., of Middlesex Hospital Medical School, and that of Ph.D. in helminthology to S. G. Solomon of the London School of Tropical Medicine.

Dr. A. M. H. Gray, C.B.E., has been elected Dean of the Faculty of Medicine for 1932–4.

KING'S COLLEGE

A course of four lectures on the influence of ductless glands on metabolism, by Dr. J. A. Hewitt, commenced on November 10th. The succeeding lectures will be given on Thursdays, November 17th, 24th, and December 1st, at 5 p.m. Admission to the lectures is free without ticket.

UNIVERSITY OF LIVERPOOL

Dr. A. Leyland Robinson, F.R.C.S., F.C.O.G., has been appointed to the chair of midwifery and gynaecology in succession to the late Professor H. Leith Murray.

UNIVERSITY OF BRISTOL

The dissertation presented by R. M. Norman for the M.D. degree has been approved by the board of examiners.

UNIVERSITY OF DURHAM COLLEGE OF MEDICINE, NEWCASTLE-UPON-TYNE

On October 28th the Court of Governors of the University of Durham College of Medicine, Newcastle-upon-Tyne, resolved by 53 votes to 28 to inform Lord Londonderry, Chancellor of the University, that they considered it advisable that he should institute an independent inquiry into the administration and constitution of the College. It is understood that the Chancellor has also communicated with the Council of the College asking their assistance and co-operation in the matter.

The third of the series of lectures on recent advances in physiology applicable to medicine will be given at the University of Durham College of Medicine, Newcastle-upon-Tyne, on Friday, November 25th, at 4.45 p.m. The lecture, entitled "The sensory control of respiration and of the heart-beat," will be delivered by Professor E. D. Adrian, M.D., F.R.S., of Cambridge. All medical practitioners in the neighbourhood are invited to attend.

BRITISH COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

The new home of the British College of Obstetricians and Gynaecologists, 58, Queen Anne Street, London, W., will be formally opened by H.R.H. the Duchess of York on Monday, December 5th, at 3 p.m., and in the evening of the same day a dinner will be held at Grosvenor House, Park Lane. The president of the college, Professor Blair-Bell, will preside at the opening ceremony and the dinner. Fellows and members who wish to be present at the opening ceremony and the dinner should apply for tickets at once to the honorary secretary, 58, Queen Anne Street, W.1.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

A quarterly meeting of the Royal College of Physicians of Edinburgh was held on November 1st, when the President, Dr. Robert Thin, was in the chair. Dr. A. B. Walker (Newtongrange) and Dr. D. M. Dunlop (Edinburgh) were introduced, and took their seats as Fellows. Dr. I. S. Hall (Edinburgh) and Dr. Jamiat Singh (Lahore) were elected Fellows.

The Hill Pattison-Struthers Bursary in Anatomy and Physiology was awarded to R. O. Walker.

Dr. Robert A. Fleming was appointed Morison Lecturer for 1933.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

At the monthly meeting, on November 4th, C. J. C. Earl was admitted as Fellow of the College, Max Honigsberger as a Licentiate and Member, and N. M. Ranade as a Licentiate in Midwifery.

Correction

In the list of candidates admitted members of the Royal College of Physicians of London, published last week (p. 860), the degree of M.D.Ed. should have appeared after the name of John Alan Bruce Young.

Medical Notes in Parliament

[FROM OUR PARLIAMENTARY CORRESPONDENT]

The House of Commons has this week discussed unemployment and foreign policy. Dr. Elliot, Minister of Agriculture, announced arrangements for the temporary reduction of meat shipments from the River Plate, and the likelihood of similar arrangements with other exporters of meat to the United Kingdom. The House approved orders imposing special duties on produce from the Irish Free State and others under the Import Duties Act.

The Parliamentary Medical Committee met on November 2nd, with Sir Francis Fremantle in the chair, when Sir WALTER FLETCHER delivered an address on medical research. A number of lay members and peers attended by special invitation. Sir Walter recounted how, under the Privy Council, much comprehensive and effective research was done on a small grant. The work on vitamins, rickets, tuberculosis, the filterable viruses, and diseases caused by them were instances of successful research. He drew attention to the fact that malaria was gaining ground, despite the researches of Ross and Manson. He explained how the Medical Research Council had agreed with the Association of Chemical Manufacturers to investigate substances of possible medical value provided that the report furnished by the Council would be published. This had led to useful collaboration.

On November 7th the Edinburgh Royal Maternity and Simpson Memorial Hospital Order Confirmation Bill was read a third time in the House of Commons.

Cancer among Employees at Nickel Works

Replying, on November 3rd, to Mr. Grenfell, Sir JOHN GILMOUR said investigations made earlier in the year, which included a special inquiry by a pathologist, did not establish that the cases of cancer among men employed at the Mond nickel works were of industrial origin; no substance known to give rise to cancer appeared to be in use at the works. It had been proposed that the next step should be an expert examination of a number of employees, but it was found necessary to postpone this owing to the closing of the works four months ago. Work might be restarted shortly, and it was intended to commence these examinations as soon as practicable. If the results should indicate that any precautions would be of value, the question of putting them into operation would be immediately followed up. Sir John did not think that a departmental committee of a similar kind to that which reported last year upon mule-spinners' cancer would be likely to get better results. Those concerned in the firm, and the Home Office, were taking every opportunity to study the problem. The medical officer connected with the firm had recently gone through a special course to bring himself up to date with the latest information on this subject.

Slum Clearance.—Replying to Mr. Denman, on November 3rd, Sir HILTON YOUNG said he had received resolutions declaring 541 areas in England and Wales, the clearance of which involved the displacement and rehousing of approximately 78,150 persons, to be clearance areas under the Housing Act, 1930. Information as to the number of areas at present in process of being cleared was not available, but 229 clearance or compulsory purchase orders had been confirmed in connexion with such areas. Upwards of 16,000 houses, which were either ear-marked or available for the purposes of the Act, had either been erected or were under construction.

Herbalists and the Ministry of Health.—Sir HILTON YOUNG informed Mr. Gordon Macdonald, on November 3rd, that he had replied by letter to a communication from the National Association of Medical Herbalists of Great Britain, Limited, asking him to receive a deputation.

The Services

HONORARY SURGEON TO THE KING

Major-General E. A. Walker, I.M.S., Honorary Surgeon to the Viceroy of India, has been appointed Honorary Surgeon to the King, in succession to Major-General H. Boulton, C.B., C.B.E., I.M.S. (ret.).

DEATHS IN THE SERVICES

Lieut.-Colonel Alexander Cameron, O.B.E., Indian Medical Service, died at Southwold, Suffolk, on October 17th, aged 52. He was born on November 18th, 1879, was educated at the Middlesex Hospital, and graduated M.B.Lond., gaining the gold medal in medicine in 1902, and also took the M.R.C.S. and L.R.C.P.Lond. in the same year. Entering the I.M.S. as lieutenant on September 1st, 1904, he became lieutenant-colonel on March 1st, 1924, and was placed on the selected list for promotion on October 17th, 1930. He served in the war of 1914–21, in Persia in 1917–19, and on the Afghan Frontier in 1919, was four times mentioned in dispatches, in the *London Gazette* of February 8th, 1917, March 7th, 1918, February 3rd, 1920, and August 3rd, 1920, and received the O.B.E. on January 1st, 1920. He was in civil employ in the United Provinces, his last appointment, before coming home on furlough, being that of civil surgeon of the summer capital, Naini Tal.

Medical News

The next Chadwick Public Lecture in London will be by Sir Pendrill Varrier-Jones, on the employment of tuberculous patients. It will be given in the theatre of the Royal United Service Institution on Tuesday, November 15th, at 5.15 p.m., with Sir James Crichton-Browne in the chair. Particulars of other lectures may be obtained of the secretary, at the offices of the Trust, 204, Abbey House, Westminster, S.W.

The British Science Guild announces that the Norman Lockyer Lecture, 1932, will be given on Tuesday, November 22nd, at 4.30 p.m., by Sir Frank E. Smith, K.C.B., F.R.S., secretary of the Department of Scientific and Industrial Research, in the Goldsmiths' Hall, Foster Lane, E.C.

Sir William Bragg, F.R.S., will deliver the Lloyd Roberts Lecture in the Physiological Theatre of the Medical School of the Manchester University on Tuesday, November 15th, at 4.15 p.m. ; the subject will be " The crystal structures of living matter."

A meeting of the Royal Microscopical Society will be held in the Hastings Hall, B.M.A. House, Tavistock Square, on Wednesday, November 16th, at 5.30 p.m. Among the papers to be read is one by Mr. J. E. Barnard, F.R.S., on ultra-violet microscopy.

At the meeting of the Medical Officers of Schools Association, to be held at 11, Chandos Street, W.1, on Friday, November 25th, at 5 p.m., a discussion on " Mouth-breathing and nasal obstruction " will be opened by Mr. Warwick James and Mr. Somerville Hastings, followed by Mr. Philip Franklin and Mr. J. G. Turner.

Sir StClair Thomson will read a paper entitled " A house-surgeon's memories of Lister " at the meeting of the Birmingham Branch of the British Medical Association, to be held on Friday, November 18th.

At the meeting of the North-West London Medical Society, to be held at the Willesden Constitutional Club, N.W., on Tuesday, November 22nd, Dr. James Mennell will give an address on joint manipulations in general practice.

The next meeting of the Biochemical Society will be held on Friday, November 18th, at 4.30 p.m., at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C. The seven papers will include one by A. L. Bacharach on " Investigations into vitamin A-free basal diets," and another by A. J. Hopkins and A. Wormall on " Phenylisocyanate compounds of proteins and their immunological properties."

A meeting of the Caledonian Medical Society will be held at B.M.A. House, Tavistock Square, London, on Wednesday, November 23rd, at 2.30 p.m. The annual dinner will be held in the May Fair Hotel at 7.30 p.m. Members intending to be present at the dinner must inform Dr. A. Cumming Grant, 122, Bedford Court Mansions, W.C.1, before November 16th.

The eighty-eighth half-yearly dinner of the Aberdeen University Club, London, will be held at the Trocadero Restaurant, at 7 for 7.30 p.m., on Thursday, November 24th, under the chairmanship of Professor R. G. McKerron, M.D. Secretary's address: 9, Addison Gardens, W.14.

The fifty-fifth anniversary dinner of the Cambridge Graduates' Club of St. Bartholomew's Hospital will take place on Wednesday, November 23rd, at 7.30 p.m., at the May Fair Hotel, with Mr. R. Foster Moore in the chair. Dr. W. Langdon Brown (Regius Professor of Physic at Cambridge) will be the guest of honour on this occasion. The honorary secretaries are Dr. H. N. Burroughes and Mr. Reginald Vick.

The Douty *X*-Ray Clinic at Addenbrooke's Hospital, Cambridge, will be opened by Sir Humphry Rolleston, Bt., on Friday, November 25th, at 3 p.m.

The Lancashire and Cheshire Branch of the British Medical Association has arranged for an exhibition of the Harvey film to be given at the Picturedrome, Garstang Road, Preston, on Wednesday, November 23rd, at 4 p.m.

The fifth of a series of lectures on renal disease, arranged by the Fellowship of Medicine and Post-Graduate Medical Association, will be given at the Medical Society of London, 11, Chandos Street, W., on November 15th, at 4 p.m., by Mr. Alban Andrews, on renal tuberculosis. These lectures are free only to members of the Fellowship. Cases of general interest will be demonstrated on November 18th, at 2 p.m., at the Lambeth Hospital, Brook Street, S.E.11. A course of six lecture-demonstrations on diagnosis and treatment of chronic rheumatism will be held at the British Red Cross Clinic for Rheumatism, Peto Place, N.W., from November 22nd to December 8th, on Tuesdays and Thursdays, at 8.30 p.m. A demonstration on the fundus oculi will be given on November 22nd, at 8.30 p.m., in the in-patient department of the West End Hospital for Nervous Diseases, Gloucester Gate, N.W.1. A course in proctology, at St. Mark's Hospital, City Road, E.C., has been arranged from November 21st to 26th. A panel of teachers is available daily for personal tuition in almost all branches of medicine and surgery ; arrangements for attendance at these clinics must be made through the Fellowship of Medicine, 1, Wimpole Street, W.1.

The first of a series of post-graduate lectures at the London Jewish Hospital, Stepney Green, E.1, will be given on Thursday, November 17th, at 4 p.m., by Dr. Julius Burnford, whose subject is " A survey of treatment " ; chairman, Sir Humphry Rolleston, Bt. Tea at 3.45 p.m.

A course in the treatment of skin diseases and syphilis will be held at the Hôpital Saint-Louis, Paris, under the direction of Professor Gougerot, from November 18th to December 17th. The fee is 350 francs. Further information can be obtained from M. Burnier, Hôpital Saint-Louis.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.**

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

The **TELEPHONE NUMBERS** of the British Medical Association and the *British Medical Journal* are MUSEUM 9861, 9862, 9863, and 9864 (internal exchange, four lines).

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The address of the Irish Office of the British Medical Association is 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 62550 Dublin), and of the Scottish Office, 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh).

QUERIES AND ANSWERS

Domestic Water-heating

"HOT-WATER" writes: I have a two-story house with eight hot-water taps, one being that in the bath, and another being a spray. The present method of heating the water is unsatisfactory and inadequate. Can any reader inform me of the best domestic water-heating system to suit me, or tell me where to turn for information?

Softening the Beard

Dr. P. J. EDMUNDS (Dulwich) writes: Shaving difficulties, as discussed recently in "Queries and Answers," are, I believe, almost always due to blunt razors, and these in turn are due to soapy or greasy strops. Strops should be washed in hot water and soap occasionally, well rinsed, and then allowed to dry. Razors should always be wiped clean from soap and debris *before* they are stropped, so as not to soil the leather. A good edge can often be obtained on a piece of brown paper, if it is dry and free from grease or varnish, without any razor paste. The essential point is to get rid of all grease and oil. The same principle is seen in the case of violin bows, the hair of which should never be touched with a finger.

Income Tax

Liability of Superannuation Allowance

"FARGATE" has retired from public service and receives a superannuation allowance of £27 yearly. Is this correctly assessed at 5s. in the £?

*** It is undoubtedly assessable; whether the 5s. rate is correct would depend on "Fargate's" other income—for example, an allowance in respect of earned income relief is due unless the maximum allowance (£250) has been given for the same year from other income.

Personal Allowance: Husband and Wife in Practice

"E. W." married on April 2nd, 1932, and has been assessed for 1932–3 on the basis of the aggregate earnings of his wife and himself in 1931-2. The personal allowances given in the assessment are £150+£45 (for earnings of wife), whereas when the income was earned the allowances due were £100+£100=£200.

*** It is assumed that for 1932–3 the wife's professional work has continued. On that basis the allowances for 1932–3 are correct, but "E. W." would appear to be entitled to repayment of tax for 1931–2 on the ground that he was a married man in that year, and was entitled to an allowance of £150 in lieu of £100.

Definite Retirement

"L. C." is selling his practice as from December 31st, 1932, and retiring from professional work. How will this affect his liability for 1932–3 and the return to be made by him in April, 1933?

*** His liability for 1932–3 will be reduced to the tax appropriate (after deduction of full personal allowances) to the amount of his earnings for the nine months ending December 31st, 1932. Also the Revenue authorities will be entitled to revise the assessment for the year to April 5th, 1932, to the tax appropriate to the earnings of that actual year. As from December 31st he ceases to be liable for professional earnings, and need not make any mention of them on his return for 1933–4.

LETTERS, NOTES, ETC.

Witch-burning

It was not without reflection and inquiry that the reviewer of *The Lame, The Halt, and The Blind*, in our issue of October 29th, assigned the date 1727 to the last judicial witch-burning in Scotland. Reference to Chambers's *Encyclopaedia* supplied inconsistent statements. Under the heading "Witchcraft" 1722 was alleged as the date, but under the heading "Dornoch" 1727 was given. Our reviewer then referred the question to the Editor of the *Encyclopaedia*, William Geddie, M.A., B.Sc., who took great pains to clear up the matter, and most courteously sent him copies of correspondence with the Sheriff-Clerk at Dornoch and observations by Dr. Malcolm of the S.S.C. Library, which space will not allow us to quote. Mr. Geddie concluded that "1727 seems to be the more likely date. I do not see much hope of advancing beyond that." Confusion between the figures 2 and 7 in some scripts is easy, and is known to occur.

Carbuncles and Boils

Mr. A. P. BERTWISTLE (London, W.1) writes: These conditions are, as Mr. Warren says of haemorrhoids, as commonly painful as they are painfully common. The more we see of them the more we come to rely on what John Hunter would call "the natural defences of the body." That incisions are no cure was shown by Sir James Paget (*Clinical Lectures and Essays*, 1875, p. 252); not only are they useless, but in the case of the upper lip distinctly dangerous. In view of the imminently unsuitable state of our knowledge of them I was tempted to use collosol manganese butyrate (Crooke's), as recommended by Dr. H. L. McCormick (October 22nd, p. 780). The patient was given 2 c.cm. daily for a week. The patient's mental outlook changed at once, the carbuncle softened, and a few large sloughs came away, though the discharge was copious. I shall certainly use this preparation again.

"Punch"

"*Punch*" *Almanack*, published this week, is a very good shillingsworth, which the family medical attendant can prescribe for his patients, old and young, with every confidence. One of the larger "literary pieces" is a detective story by Evoe, who succeeds Sir Owen Seaman in the editorial chair. Polished wit, delicate humour, and admirable taste have always distinguished the writings of Mr. E. V. Knox, and the tradition of *Punch* is secure in his hands.

Corrigenda

In Dr. J. B. Simpson's letter on maternal morbidity, on page 855 of our last issue, an inaccuracy occurs owing to a wrong interpretation of the author's corrected proof. From the seventeenth line the text should read: "... and cause anxiety to both doctor and nurse in country practice. Even in L.O.A. positions of the vertex muscular young primiparae frequently require instrumental help," etc.

The conclusion of Dr. Wright Lambert's letter on "Fractures of the mandible" (November 5th, p. 858) should have run: "... where the only treatment he had received was a bandage to support his chin, and they told him to report at the end of a week."

"B.P. 1932"

Messrs. C. J. Hewlett and Son, Ltd. (Charlotte Street, E.C.2), are issuing to their medical and pharmaceutical clients a useful 46-page pamphlet entitled *Notes on the British Pharmacopoeia, 1932*, by E. J. Millard, Ph.C., F.C.S. They will forward a copy to any medical practitioner who applies for it, as long as the supply lasts.

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 45, 46, 47, 50, and 51 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 48 and 49.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *251*.

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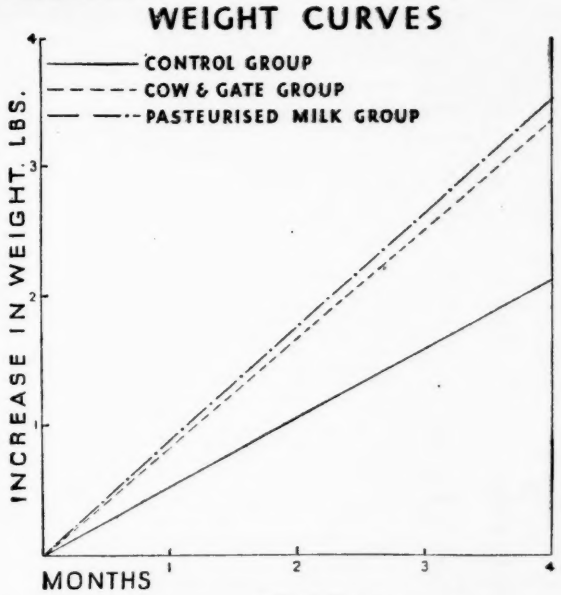

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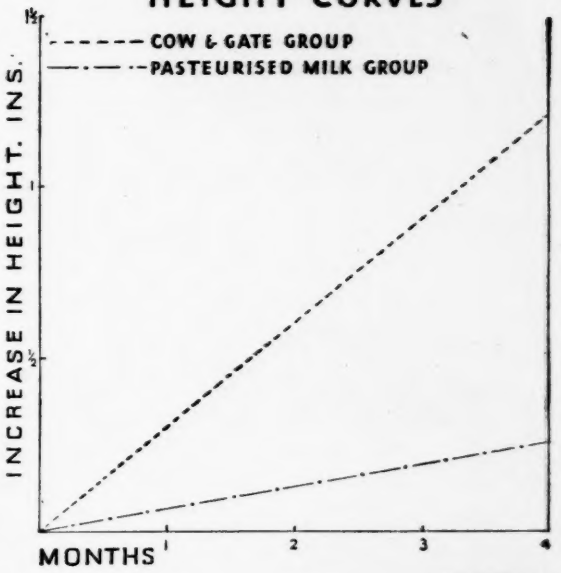

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